Pander Society Newsletter

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PALAEOBIOLOGY SECTION, DEPARTMENT OF NATURAL HISTORY
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Chief Panderer's Remarks May 31, 2007

Dear Conodont Colleagues:
I hope that you are all well, and that your conodont work flourishes. Thank you for sending in your reports and questionnaires; also, a big "Thank you" to compiler and editor Joan Burke (Toronto) and webmaster Mark Purnell (Leicester) for their dedication and ongoing interest in assembling and distributing this Newsletter.

The past year has been an interesting and productive one in the world of conodonts. We started off in a big way in the summer of 2006, with ICOS 2006, the first International Conodont Symposium in Leicester, England, organized by Mark Purnell. This, the successor of ECOS, the European Conodont Symposium, is intended to provide a truly international forum and meeting place; judging by the attendance and participation at Leicester, ICOS 2006 was very successful in bringing many diverse individuals and interests together. A very tangible outcome of this intent was the decision to convene ICOS 2009 in Canada.

In October 2006, a remarkable series of papers was presented at the Symposium On Geochemical Aspects of Conodonts entitled "An appetite for apatite: conodont-based geological investigations in the 21st century", organized and convened by Jeffrey Over, Jared Morrow and Maya Elrick at the Annual Meeting of the Geological Society of America in Philadelphia, Pennsylvania, U.S.A. Finally, in April 2007 James Miller and Stephen Leslie organized a very successful and well organized Pander Society Symposium entitled " Mixed-up conodonts: extracting useful information and solving geologic puzzles using stratigraphic leaks and redeposited faunas" at the joint meeting of the North-Central and South-Central sections of the Geological Society of America in Lawrence, Kansas.

At the same GSA meeting in Kansas, several sessions other than the Pander Society Symposium, had great strength in conodonts and sort of 'snuck up' on me (and perhaps others). Thus, the morning session of Sequence Stratigraphy and Biostratigraphy of Pennsylvanian–Lower Permian Cyclothems in the North American Midcontinent, Gregory P. Wahlman and Philip Heckel presiding, and a poster session entitled Stratigraphy, were notable for their domination by conodont- related subjects (6 and 3 papers, respectively)..

Judging by the programmes at these meetings, conodonts are remarkably 'alive and well' on this, the 40th anniversary of the conception of the Pander Society in Calgary, Alberta, Canada, in 1967 (if you don't believe me, just compare the size of this Newsletter, with Newsletter # 1 (that follows). Keep up the good work, keep those news items coming, and to paraphrase Marek Narkiewicz (Other News) (and with apologies to Star Wars): May the Conodont Force Be With You.

My best wishes to all of you.

Peter
Peter H. von Bitter, Chief Panderer.

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PANDER SOCIETY NEWSLETTER (NO. 1) October 18, 1967

[reprinted courtesy of Charles Sandberg]

THE Pander Society was organized at the International Symposium on the Devonian System in Calgary, Canada on September 8, 1967. The purpose of the Society is [to] continue the work of C.H. Pander on conodonts by making others aware of the progress of our own conodont studies. This is to be accomplished by a newsletter to be issued at irregular intervals, by informal discussion meetings at national and international geological meetings whenever the group of conodont works present is large enough to make a meeting worthwhile. There will be no dues, no publications and not much organization.

This letter is a report of the organizational meeting and a CALL FOR NEWS ITEMS TO BE INCLUDED IN THE NEXT NEWSLETTER TO BE MAILED IN MARCH 1968.

The idea of a meeting of conodont workers at Calgary occurred to K.J. Müller, L.V. Rickard and J.W. Huddle while drinking cocktails at the opening reception because they were impressed by the number of conodont workers present. The first meeting of the Pander Society was held in the Rehearsal Room of the Jubilee Auditorium in Calgary, Canada at 4 p.m., September 8, 1967. John Huddle served as chairman and L.V. Rickard acted as secretary. Twenty-five conodont workers were present. Everyone present introduced themselves and gave a brief statement of current conodont work and papers in preparation. (A list of those present is appended.)

Attention of the group was called to I.C.Z.N. Article 30, (a), (i), (3). Examples, which state that gnathus is to be treated as a masculine noun even though it is feminine in Greek. Although conodont workers have been treating the conodont generic names ending in gnathus as feminine for 35 years, it was agreed that conodont workers should abide by the rules and not request exemption.

Collinson suggested the name Pander Society and suggested that the Society be patterned after the Ludlow Research Group, which has a Secretary who sends out a newsletter at irregular intervals. David Clark asked what the Society might do? Ellison and Huddle replied that it could send out newsletters, arrange meetings of conodont workers at large national and international geologic society meetings and congresses and promote better communication among conodont workers. They felt that now there are so many conodont workers that we are unable to keep up with the work of others by correspondence as we have in the past. Glenister suggested a meeting of the Society at Iowa City at the Midwest section of the Geological Society of America. Huddle suggested meeting at North American Paleontological Convention in Chicago September 5-7, 1969 and Walliser was asked to try to arrange a meeting place for a conodont worker discussion group at the International Geological Congress in Prague in 1968.

Clark reported that he has an IBM card file of conodont species which is nearly up to date. He indicated that this file might be available on a cost basis to other conodont workers. Collinson suggests that this might be a good initial project for the Pander Society.

It was moved by Ellison and seconded by Weber that John Huddle be made President of the Pander Society for one year and the motion passed.

There was a short discussion of the nomenclatural problems raised by “conodont assemblages.” A tentative suggestion to ignore them was talked down vigorously and the feeling was expressed that we must work toward a unified nomenclature. A request for placing of types in reliable museums was piously made and agreed to be desirable.

Meeting adjourned at 5.10 p.m.

NAMES OF THOSE ATTENDING THE ORGANIZATIONAL MEETING: T. T. Uyeno; D. Mason; Chris R. Barnes; Brian F. Glenister; Ulrich Mayr; L.V. Rickard; Michael C. Mound; Gilbert Klapper; Graeme M. Philip; C. Gordon Winder; David L. Clark; Klaus J. Müller; Ray Ethington; Charles A. Sandberg; Lorne Vopni; Jean Le Fèvre; Charles Collinson; Dietmar Schumacher; Samuel P. Ellison; Allen R. Ormiston; John W. Huddle; Otto A. Walliser; Jerry Golden; Gerald F. Webers; C. G. Tillman.

The Significance of 1967 Organizational Meeting of the Pander Society

"The 1967 International Symposium on the Devonian System in Calgary represents an historical watershed in my view. Prior to that time, non-conodont biostratigraphers were generally reluctant to accept the results of conodont biostratigraphy. [There were historical reasons for this, partly because some of the earliest described faunas such as those of the Saverton and Holts Summit in Missouri contained many reworked Devonian conodonts. The conodonts Branson & Mehl (1934) published in their pioneering study were not from the Grassy Creek - this is clarified in several volumes of the Catalogue of Conodonts.] One gets a clear idea of the situation where Hass (1959, p. 367) discusses the skepticism he encountered about the reworking of Devonian faunas into the Mississippian Chappel Limestone.

At the Calgary meeting, however, it was noticed how many of the stratigraphic review papers delivered by non-conodont workers relied onconodonts as the primary evidence for correlation. As I recall, it was John Huddle and Larry Rickard who primarily noticed this and assembled the 20 or so conodont workers who were present in an improvised meeting during the last day. The Pander Society was initially formed at this meeting. Charles Collinson suggested that the organization of the group follow the model of the Ludlow Research Group: informal, membership completely open, and no dues. John Huddle was unanimously elected as "Chief Panderer." Brian Glenister and Carl Rexroad then organized the first formal meeting of the Society in Iowa City in the spring of 1968 (at the North-Central section of the GSA), featuring a symposium on multielement taxonomy. Stig Bergström and Walter Sweet organized the 1969 meeting at Ohio State (also a North-Central GSA sectional meeting) featuring a symposium on conodont biostratigraphy (later published as GSA Memoir 127 in 1971)."

(courtesy of Gilbert Klapper) (from an e-mail to Simon Knell, Oct. 2005)

40th Anniversary Volume of the Pander Society

To commemorate the 40th anniversary of the founding of the Pander Society, as well as to provide a forum for the papers that were presented at the North American Pander Society meeting in 2006 (Conodonts in Sequence Stratigraphy), ICOS 2006, a theme session at GSA in 2006 (Conodonts in the 21st Century), and the North American Pander Society 2007 (Mixed Conodont Faunas) a theme volume on these and other conodont topics will be published toward the end of this year, or certainly by early 2008. It has been a good two years, on top of the last 38, with advances in conodont affinities, biostratigraphy, robust geochemistry, and other topics.

The cost of publication is $35/page, $120/plate (black and white), color plates and figures are $800. *Paleontographica Americana* is an old and storied publication of the Paleontological Research Institute in Ithaca, New York. Printed by Allen Press, but not on a publication schedule, so this can go to press when assembled. Jeff Over suggests that contributors pay for the cost of plates, and anything else that they can contribute, and that he will work on funding for the remainder.

Instructions for authors are at http://www.priweb.org/bookstore/author_instructions.html Please follow these instructions in regard to page layout, heading, reference format, etc. Submissions need to be sent electronically (not three printed copies and glossy plates). Text will be in the form of a word document; figures and plates need to be 300 dpi and can be tif, ai, cdr, or compatible format.

Please send manuscripts to D.J. Over - over@geneseo.edu - before 10 July 2007. The target final submission of revised manuscripts is 10 December 2007.

(submitted by Jeffrey Over)

Lennart Jeppsson and Richard Aldridge Receive Pander Society Medal

Lennart Jeppsson of Lund University and Richard Aldridge of Leicester University, were each presented the Pander Society Medal at the ICOS 2006 Banquet in Leicester, England, in July, 2006, in recognition of their long and outstanding contributions to conodont studies (see meeting report below). John Talent and Paul Smith, the organizers of the two international groups that nominated Lennart and Richard, respectively, read the citations, and the Chief Panderer made the presentations. Much merriment and celebration of the accomplishments of our two newest Pander Society medallists ensued, in the remarkable setting of ancient Coombe Abbey.
The Pander Society Medal Committee consisting of John Repetski, Cristina Perri and Cheng-yuan Wang, thank you, the membership, for submitting nominations, and thank John Talent and Paul Smith for soliciting and organizing international support, and for making the presentation of the engraved medals possible.

Mark Purnell Receives the Pander Society's Hinde Medal for Young Conodont Researchers

The idea of a medal for recognizing the work of young conodont researchers moved forward rather dramatically at ICOS 2006, when the Pander Society Medal Committee recommended Mark Purnell of Leicester University to be the first recipient of this new award. The presentation was made by the Chief Panderer at the Society Banquet at Coombe Abbey, in recognition of Mark's meteoric rise in the conodont community, for his innovative and always creative work, and for the organization of ICOS 2006, a meeting 'marked' by its smooth organization and execution. For technical reasons, an actual physical award could not be presented at the banquet; the Medal Committee and the Chief Panderer are working to remedy this. Lennart Jeppsson has very generously offered to assist with the financing of this award.

George Jennings Hinde (*Hindeodella*, *Hindeodelloides*, *Hindeodus*) was a British micropalaeontologist who in the 1870s, like Mark more than a century later, lived and worked on conodonts in Canada. In 1879, Hinde published his important observations on Ordovician and Devonian conodonts of S. Ontario and W. New York, in the process doing the (first) multielement taxonomy (on *Polygnathus dubius*), and having remarkably modern ideas about the close relationship between conodonts, hagfish and lampreys.

Thank you

The Pander Society thanks the Department of Natural History, Royal Ontario Museum, for financial support that has, for the last three years, made the assembly and production of this Newsletter possible; the Society also thanks Leicester University for permitting the Newsletter to continue to be distributed from the Leicester University server.

Business Meetings

The Chief Panderer convened and chaired two Pander Society business meetings in the last year, one at ICOS 2006 in Leicester and the other in Lawrence, Kansas, in 2007. That in Leicester involved discussions re the Hinde Medal, omissions/ mistakes in the Newsletter (with apologies to Katarzyna Narkiewicz & José [Nacho] Valenzuela-Rios), as well as the location of the next International Conodont Symposium. Charles Henderson offered to host that symposium in W. Canada, an offer that was graciously accepted by the assembled Panderers; it was determined that because of other international meetings in 2010, that ICOS be held a year earlier, in 2009, i.e. that it be ICOS 2009.

The business meeting in Lawrence, was notable for the presence of former Chief Panderers, Ray Ethington and Carl Rexroad. Business was minimal, with the Chief Panderer making a short presentation (largely courtesy of Gilbert Klapper) on past conodont work and workers at the University of Kansas (Youngquist, Klapper, Goebbel, Thompson, von Bitter, among others). Discussion centered on the location of the next North American meeting of the Pander Society; it was decided to meet with the joint North-Central and South-Central sectional meeting of the Geological Society of America in Evanston, Indiana. Jed Day offered to organize the meeting, and Carl Rexroad indicated his willingness to conduct a field trip. Both offers were appreciated and accepted.

The Distribution of Conodont Publications: Something to think about

Last year's Newsletter included a discussion, initiated by Lennart Jeppsson, about how to best distribute our conodont publications in this electronic age. The methods presently available seem to be evolving, and include:

1) Electronic distribution of reprints from a central institutional email listserver such as con-nexus. The main difficulty with this mode of distribution centres on the copyright of the papers being distributed. In most cases copyright resides with the publisher, and they place legal restrictions on electronic distribution. Other problems with this method include that the sheer volume of our words could overwhelm the email server capacity, receiving manuscripts from such an automated system would be involuntary on the part of the recipient (and would be a lot like receiving Spam), and many people's computers are purposely set to limit the size of incoming files.
2) A variation to this method distribution briefly touched on last year is where the author(s) of a new publication provide the electronic address or site from which a specific publication is available. In this method, the recipient controls whether or not to access and down load the reprint file; the downside seems to be that the publication file may be posted for only a limited time, and may 'disappear'. Copyright issues mean that this is generally not an officially sanctioned mode of distribution. In this year's Newsletter, Dumolin et al. (2006) and Morrow and Sandberg (2006), and Sandberg et al. (2006) make their work available by this method. Several authors have been distributing pdf files via their personal website for years.
3) A number of authors in this Newsletter, including Maas et al. (2006), Merrill and von Bitter (2007), Miller et al. (2006), Repetski et al. (2006), von Bitter (2007) and von Bitter et al. (2007), have indicated that pdf files of their publications are available electronically, upon request; also, please note that the programme and abstracts of ICOS 2006 have been posted as a pdf file on the Leicester University server at www.conodont.net .
4) Hass et al. (2006) and Sansom et al. (2005) have, in this year's Newsletter (see Bibliography), attached doi codes to their publication. A digital object identifier (doi) code is apparently assigned by a journal such as Geology or Science to each paper published by them, allowing the publication to be accessed and printed, when the code is entered into the doi web site (http://www.doi.org/). Access, however, is generally contingent on holding an individual or institutional subscription to the journal in which the paper is published.
5) Abstracts available on the web; for example, the Geological Society America makes available abstracts from past GSA meetings at http://www.geosociety.org; go to Meetings and Excursions, and then click on Past Meetings. Abstracts in this Newsletter were accessed and reproduced in this manner.

Given the problems of method 1 (above), at the present time methods 2-5 seem to be the practical and quick ways controlled by the recipient, of inexpensively accessing & obtaining copies of new publications.

Distribution of Conodont Bibliographies

The computer programme EndNote is used to compile the yearly Newsletter bibliography. Thus, if you use EndNote (or similar bibliographic software) you will be able to directly import the annual bibliography into a library file, saving you tedious typing time. Files will be made available via www.conodont.net and the Pander Society website, complete with instructions for downloading and importing. Starting in 2006, bibliographic files from each of the Pander Society Newsletters will (hopefully) be available *ad infinitum.* These bibliographic files are the electronic version of the bibliographies formerly compiled by Samuel Ellison, and others before him.

Because of the sheer volume of conodont publications that you report each year, and because of the diversity of languages in which you publish, relatively few of the publications listed in the annual bibliography can be checked in detail by your editors. Thus, if you submit non-conodont publications, there is generally no way of ‘weeding’ these out; the control of what ends up in the Conodont Bibliography depends almost solely on the self-control that you, the submitting authors, exercise.

If you are able to, please submit your publications in EndNote compatible format, making the editors’ job of assembling the Pander Society Newsletter easier.

Sepkoski Grants: Paleontological Society International Research Program

The Paleontological Society announces the continuation of its small grants program for paleontologists living in Eastern Europe and republics of the former Soviet Union. For 2007, thirty grants of US $500 will be awarded. Applications are due by April 1, 2007. Please go to the PS website at http://www.paleosoc.org/palsirp.html <http://www.paleosoc.org/palsirp.html> to obtain further details and instructions on how to apply for funds in the future.

If you have colleagues who are eligible to participate in this program but who may be unaware of it, please forward this announcement to them.
Thanks!

If you have visited the site before, your computer might bring up the 006 announcement from its cache. If this occurs, please reload or refresh the page to obtain the updated webpage.

(submitted by Carl Rexroad)

Visit the conodont collections at the Natural History Museum (London)?

Are you based in the member states of the EU? Would you like to visit the conodont collections at the Natural History Museum in London?

The SYNTHESYS Office is pleased to announce the 6th call for proposals under the European Commission's FPVI European-funded Integrated Infrastructure Initiative. SYNTHESYS Project funding is available to provide scientists (Users) based in European Member and Associated States to undertake short visits to utilize the infrastructure (namely the collections, staff expertise and analytical facilities) at one of the 20 partner institutions (see full list below) for the purposes of their research. The 20 partner institutions are organised into 11 national Taxonomic Facilities (TAFs). TAF Users will be hosted by a TAF staff member.
The 11 TAF institutions represent an unparalleled resource for taxonomic research offering: Collections amounting to over 337 million natural history specimens, including 3.3 million type specimens. Internationally renowned taxonomic and systematic skill base· Chemical analysis, molecular and imaging facilities. Proposals will be welcomed from high calibre researchers seeking access for short-term visits. SYNTHESYS is able to meet the users' costs for: Research costs*, international travel, local accommodation whilst based at the TAF, a per diem to contribute towards living costs [*research related costs may include: bench fees and consumables (including molecular biology at some TAFs)]. See www.synthesys.info for more information or contact synthesys@nhm.ac.uk
Please circulate this information amongst your colleagues. If you are thinking of applying to visit, then please contact Giles Miller first & check with him re future competitions
(Past) Deadline: March 30th, 2007.

(submitted by Giles Miller)

Reports of past conodont meetings:

ICOS 2006 The First International Conodont Symposium; University of Leicester, Leicester, U.K., July 12 - 30, 2006.

The programme and abstracts for this very stimulating meeting may be accessed and downloaded from www.conodont.net

A very hot week in July 2006 saw the meeting of the 1st International Conodont Symposium (ICOS 2006) at Leicester, U.K. There was a good attendance of delegates from all reaches of the world, including, Japan, China, Australia, USA, Canada and a large number of European countries represented. Most people arrived on Sunday 16th July at the leafy halls of residence, Beaumont Hall, situated next to the Leicester University botanical garden. A bar was conveniently situated within the halls and delegates were told that the bar would stay open after the icebreaker, as long as it was frequented, so we all did our utmost to keep it that way. The first night was a time for many friends and colleagues to catch up on each other's research and to get some conodont gossip. Eventually the delegates that had been on the pre-conference field trip to Ireland returned for the conference looking unusually tanned. Perhaps they didn't go to Ireland, but the hot weather was set to continue for the entire conference and also for the post conference trip to the north of England and Scotland.

The talks were of a high standard, and praise is due to those non-English speakers who gave talks in English. Many posters were laid out in the hall and people were free to wander round as they had their lunch. Over 50 oral presentations were given and around 25 posters. The talks were grouped into several themed symposia, each with one or more keynote speakers. Monday morning saw the first symposium of the conference, dealing with Panders' legacy 150 years on. This was followed by talks looking at coniform conodont apparatuses and architecture, prompting many good discussions. Tuesday included symposia on Devonian conodont biostratigraphy and also the palaeobiogeography and palaeoceanography of conodonts. The next day (Wednesday) was left for day excursions, and a chance for the vending machines to be re-stocked with cold drinks, which after two days of hot weather had been very well used. Talks resumed on the Thursday and included two symposia, the first on Triassic conodonts: taxonomy and timescales, followed by the final symposium on conodont phylogenies: alternative approaches, implications and applications.

A fabulous reception at New Walk Museum was provided on Monday night with a fine array of buffet food, including some local delicacies and traditional British grub for those wishing to try it. Pickled walnuts and onions were most amusing to those who had never seen them, but the pork pies, sausage rolls and scones with cream and jam didn't last long. Good ales as well as wine were all provided, and a chance to converse in a nice setting beneath the museum's sauropod made for a fantastic night. Thanks are due to Hitachi High-Technologies, who sponsored the reception.

On Wednesday, people were free to pursue one of several organised excursions or to look around Leicester. Two day trips were organised, one to the Carboniferous rocks of North Staffordshire, where not only was there the chance to see some classic conodont localities, but an eccentric British pub was visited for lunch. The pub contained many amusing things from yesteryear including old music boxes, and a slightly non-humane looking, ACME dog carrier. The alternative trip was to the Natural History Museum in London, this met with a few delays, but reached the museum in the end. Giles Miller had kindly arranged for those wishing to see particular collections to do so, and others looked round the museum.

On Thursday night there was a chance to go to a medieval banquet at Coombe Abbey, near Coventry. Dressing up was optional and most people, not knowing if others would do the same chose not to. Others may have opted out of bringing their suits of armour and swords due to baggage limit and airport security. We were welcomed by the abbot and led through to the great hall, where the Chief Panderer, his delightful, but alas temporary consort, Lady Cristina Perri, and assorted noble dignitaries, were seated at the head table. Dinner was simple but hearty grub and made more realistic by the lack of utensils, and the good mead. There was a chance to recognise those who had made a significant contribution to the world of conodont research by awarding the Pander Society Medal to Richard Aldridge and Lennart Jeppson, and the Hinde Medal to Mark Purnell. Dinner was followed by music, dancing wenches and a jester.

Friday afternoon was spent in a remarkable workshop, taking the opportunity of 'meeting' and examining all the conodont greats- conodont animals, conodont skeletons and conodont eyes from the classic Granton Beds in Scotland, the Soom Shale in South Africa, and the Eramosa Lagerstätte in Ontario, among others.

Mark Purnell is especially thanked for organising the meeting, accommodation and meals at which we all had a great time. The time and effort spent by him and the rest of the committee and the volunteers

Lennart Jeppsson and Dick Aldridge receive their Pander Medals from 'Baron of Coombe' Peter von Bitter. (Photos by Ann-Sofi Jeppsson)

from the University of Leicester was greatly appreciated by those in attendance. The pre- and post conference excursions, *The Carboniferous of Ireland* (led by George Sevastopulo) and *Iapetus – from Coast to Coast* (led by Howard Armstrong, Rob Raine & Paul Smith) were also successful and most enjoyable. The efforts of everyone involved in organising them were clearly evident in the smoothness with which they ran.

(submitted by Robert Raine).

Symposium On Geochemical Aspects of Conodonts: AN APPETITE FOR APATITE: CONODONT-BASED GEOLOGICAL INVESTIGATIONS IN THE 21ST CENTURY, 2006 Annual Geological Society of America Meeting, Philadelphia, PA, U.S.A. October 22-25, 2006 organized by Jeffrey Over, Jared Morrow and Maya Elrick. Abstracts reproduced in order of presentation, with apologies if any abstracts were missed, here and elsewhere.

All abstracts of conodont, or conodont-related, papers, presented at Geological Society of America meetings in 2006 & 2007 are reproduced courtesy of Geological Society of America, P.O. Box 9140, Boulder, CO 80301-9140 USA (http://www.geosociety.org)

AN APPETITE FOR APATITE: THE FIRST 150 YEARS

OVER, D. Jeffrey, Department of Geological Sciences, SUNY-Geneseo, Geneseo, NY 14454-1401, over@geneseo.edu, ELRICK, Maya, Earth and Planetary Sciences, University of New Mexico, MSC03 2040, 1 University of New Mexico, Albuquerque, NM 87131, and MORROW, Jared, Dept. of Earth Sciences, Univ of Northern Colorado, Campus Box 100, Greeley, CO 80639

This is the 150th anniversary of the publication of Christian Heinrich Pander's monograph on Baltic conodonts that initiated studies of these fabulously interesting and useful microfossils. 2006 is also the 40th anniversary of the founding of the Pander Society – the conodont working group named in his honor - that had its first meeting in 1967. The time line of conodont studies can be divided into four stages. The first comprises initial finds and descriptions (1856 to 1930) represented by the works of Pander, Hinde, Jones, Rohon and Zittel, and Ulrich and Bassler that established conodonts as a widespread Paleozoic (and Triassic) fish-tooth-like fossil of unknown affinities. The second age is a period of systematic collection and study (1930 to 1960) by the great pioneers, working mostly in mud rocks, that resulted in conodont discoveries around the globe, represented in works by Branson and Mehl, Eider, Ellison, Furnish, Gunnell, Huddle, Rhodes, Schmidt, Scott, Stauffer, Youngquist, and Zebera. These studies brought conodonts into the mainstream as biostratigraphic tools. A Golden Age followed (1960 to 2000), with numerous researchers at government-, industry-, and university-centers around the world, a volume of the Treatise, and marked by refined biostratigraphy, global correlation, paleoecological studies, use of color alteration as a geothermometer, establishment of affinities, and the start of geochemical studies. The New Age (2000 onward), perhaps a Dark Age as well due to current shifts in government, industry, and university hiring, heralds a continuation of taxonomic and biostratigraphic refinement, studies on physiology, correlation tied to subzonal cycles recognized in sequence stratigraphy, magnetic susceptibility, as well as isotope and trace metal stratigraphy, and the use of smaller and smaller samples with better and better techniques to enable even single denticle geochemistry to solve geological problems. Current work demonstrating that conodont elements faithfully record the geochemistry of ancient oceans gives hope that the New Age will ultimately be one of Enlightenment also, with conodont work resuming its vital role as an essential part of integrated geoscience research. Examples of such recent, innovative conodont-based studies are highlighted in this symposium.

CONODONT APATITE AS A PALEOTEMPERATURE PROXY: RECENT DEVELOPMENTS

JOACHIMSKI, Michael M., Institute of Geology and Mineralogy, University of Erlangen, Schlossgarten 5, Erlangen 91054 Germany, joachimski@geol.uni-erlangen.de

Conodont apatite has rarely been used for oxygen isotope analysis due to the small size of conodont elements and the number of elements required by conventional analysis. With new analytical techniques, isotope analysis can now be performed on a relatively small number of elements. Since apatite has a high potential to preserve its primary oxygen isotope composition, isotope ratios measured on conodonts may serve to decipher the paleotemperature history of Paleozoic and early Mesozoic seas. In addition, paleotemperatures calculated from the oxygen isotope ratios can help to reconstruct the life habitat of different conodont genera.

Currently available oxygen isotope data indicate that thermal overprint does not affect the oxygen isotope ratio of apatite phosphate up to a conodont colour alteration index of 5. Analysis of Devonian and Carboniferous shallow-water and pelagic conodonts from several time periods reveal no prominent difference in their oxygen isotope ratios. This suggests that pelagic conodonts were not thriving in deeper but surface waters and that oxygen isotope ratios of shallow-water as well as pelagic conodonts can be used to reconstruct surface water temperatures. This finding facilitates isotope analysis of conodonts since analyses have not to be performed on monospecific samples. However, further tests have to be performed on conodonts from other time intervals.

Short-term as well as long-term changes in the oxygen isotope ratios of Ordovician to Carboniferous conodonts are interpreted as the consequence of climatic changes and the waning and waxing of high-latitude ice sheets. However, conodonts do not show a prominent secular decrease in the oxygen isotope ratios as indicated by the oxygen isotope record of brachiopod calcite. Consequently, the conodont oxygen isotope record does not support the hypothesis that the oxygen isotope composition of the Paleozoic oceans was significantly different from the modern oceans.

BIOTIC REACTION TO ENVIRONMENTAL PERTURBATIONS: THE PARADOX OF THE LATE DEVONIAN

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The Late Devonian is punctuated by a series of environmental perturbations documented by the development of anoxic facies in many depositional settings. We focus on two of these events: the Upper Kellwasser (UKW) marking the Frasnian–Famennian boundary that severely affected the marine biota, and the Lower Kellwasser (LKW) that predates the UKW by about 0.8 Ma. Pelagic organisms were less affected than benthic faunas and thus can be used to trace fine scale paleobiological reactions to the Kellwasser events. Conodonts are one of the most common tropical planktonic fossils of the Upper Devonian and are interpreted as elements of the buccal apparatus of an animal related to early vertebrates. The genus *Palmatolepis* is the major component of the conodont fauna in Late Devonian open ocean waters and has been chosen for morphometrical analyses. Conodonts were extracted from conodont-rich limestone levels of the Coumiac and the La Serre sections in the Montagne Noire (France). Fine morphological variations of the genus *Palmatolepis* were quantified using an outline analysis of its platform. Oxygen isotope analyses were performed on conodont apatite and compared to conodont shape changes through the late Frasnian and early Famennian. Paleotemperatures derived from oxygen isotopes of conodont apatite indicate two cooling phases associated with both Kellwasser events, the larger shift being associated with the LKW. In parallel, the tooth-like *Palmatolepis* elements show two morphological shifts, the larger one being associated with the UKW. The discrepancy between the two signals points to a paradox: the UKW caused a stronger biotic response despite a minor environmental change. Despite this paradox, the changes in the shape of *Palmatolepis* are overall correlated with changes in the oxygen isotope ratios, with different relationships observed in the Frasnian and the Famennian. We speculate that climatic changes affected nutrient levels in surface waters and thus the diet of the conodont animals, selecting for a different functioning of the feeding apparatus and hence a different shape of the conodont elements.

THE LUDLOW LAU EVENT - ANOTHER GLACIATION IN THE SILURIAN GREENHOUSE?

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Different paleoclimatic and paleooceanographic models have been discussed for the Silurian in order to explain the instability of the environment as indicated by oceanic and extinction events, sea-level changes and the fast switch between warm and cold climates. Changes in the Silurian $\delta^{18}O$ record of brachiopod calcite coincide with positive excursions in $\delta^{13}C$, suggesting that changes in the global carbon cycle may have resulted in prominent climatic changes. Indeed, well-dated Llandovery through Wenlock diamictites from Western Gondwana give evidence for Lower Silurian glaciations, but up to today, there is no geological record of Upper Silurian glacial sediments.

Oxygen isotope values measured on conodonts from Gotland (Sweden) and from several sections of the Prague Basin (Czech Republic) show an increase by more than 2 ‰ during the Ludfordian Lau Event. This increase in $\delta^{18}O$ translates into cooling of surface waters of about 8° C assuming no major changes in salinity. However, cooling of low to mid latitude surface water temperatures by 8° C seems unrealistic. Consequently, we interpret the +2 ‰ increase in $\delta^{18}O$ as the combined signal of the build-up of polar ice caps and climatic cooling. The +2 ‰ change in conodont apatite compares relatively well to Pleistocene interglacial-glacial changes in $\delta^{18}O$ measured on surface dwelling foraminifera suggesting that the amplitude of Pleistocene (~120 m) and inferred Late Silurian glacio-eustatic sea-level changes might have been of comparable magnitude. Independent sedimentary evidence from Gotland and southernmost Sweden supports a Late Silurian glaciation. A substantial and stepped downward shift in coastal onlap and development of karst suggest that the forced sea-level fall associated with the Lau Event was of greater magnitude than any other Silurian short-term sea-level change in the Baltic Basin. Even the most conservative estimation of the magnitude of the sea-level fall amounts to several tens of meters.

A COUPLED OXGYEN ISOTOPE AND TRACE METAL RECORD OF GLACIOEUSTATIC SEA LEVEL VARIATION AND ENHANCED WATER COLUMN PRODUCTIVITY

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Oxygen isotope records of phosphatic microfossils have the potential to extend detailed paleoclimate and paleoceanographic records much deeper in Earth history than previously possible. This study provides a high resolution, stratigraphically controlled, oxygen isotope database of Late Carboniferous cyclic sedimentary deposits within the North American midcontinent. These data, recorded within conodont apatite, yield oxygen isotope excursions of 1.7‰, 0.6‰, and 0.8‰. Each of these excursions occurs between the deep and shallow water facies of three North American midcontinent cyclic deposits: the Upper Ft. Scott (Desmoisian) and the Swope and Dennis (Missourian), respectively. The observed shifts are of the magnitude recorded by Cenozoic marine microfossils on glacial/interglacial timescales. These trends occur generally in phase with lithologic change attributed independently to changing sea level; however, the majority of the isotopic shift is observed within the black shale (deep water) facies. This does not support a model of gradual isotope and sea level change completely in phase with lithofacies shifts. We interpret this more complex record as evidence of efficient nutrient cycling with the onset of anoxic bottom waters and black shale deposition, leading to enhanced primary productivity in the overlying water column. Initially, the increased organic flux would sustain bottom water anoxia and black shale deposition despite decreasing sea level and any weakening of water column stratification. Eventually, sea level decrease linked to Gondwanan glacial growth led to more frequent disruption of the chemocline, allowing mixing between anoxic bottom water and the oxygenated surface water. Ultimately this shallowing resulted in loss of a distinct chemocline and cessation of black shale deposition. This model is supported by decreasing trace metal and organic C concentrations within the Hushpuckney black shale member of the Swope formation seen in previous studies. As with oxygen isotope records from more recent samples, interpretations of deeper Earth history require high resolution stratigraphically controlled sampling and careful examination of each cyclic record.

CONODONT APATITE: A GEOCHEMICAL AND ISOTOPIC TIME CAPSULE OF THE PALEOCEAN?

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Interest in the chemical evolution of the paleocean has increased the search for minerals that reliably record chemical/isotopic

composition of the ancient ocean. Conodont apatite has long been considered because of its low chemical reactivity and high concentration of elements suitable for isotope analyses. Nonetheless, the interpretation of conodont composition has been limited by uncertainty: Are chemical elements primary (in vivo) or incorporated as a result of postmortem recrystallization/exchange on the seafloor and during diagenesis? We attempt to reduce this uncertainty by thorough characterization of conodonts of different ages and thermal maturities using petrographic, (optical, SEM, CL), microanalytical (laser ablation ICP-MS, microprobe), X-ray diffraction (XRD), and isotopic (Sr, Pb, Nd) analyses.

Differences in crystallinity and chemical composition among morphologic phases of conodont elements are most simply explained as primary differences. Conodonts exposed to saline depositional waters or temperatures > 300˚ C (CAI 5) are excluded because of visible recrystallization. XRD of white and hyaline matter display well ordered, highly crystalline apatite patterns. Basal plates, however, are significantly less crystalline and similar to other biogenic/sedimentary apatite. Systematic chemical differences in Sr, transition, and REE elements between hyaline and white apatite and fine-scale chemical zoning within single elements are believed to reflect biologic growth. Moreover, the absence of chemical zoning from core to rim or around natural internal porosity in conodonts suggests elements were not introduced postmortem.

Variance in some samples can be shown to result from mixing of conodonts that are coeval with sedimentation and mechanically reworked older conodonts. Compositional changes between samples collected within 5 cm of vertical section emphasize the need for thin sample intervals. Distinct chemical and isotopic signatures contained in reworked conodonts and closely spaced samples, despite having undergone identical diagenetic histories, suggests retention of primary chemical composition. Taken together this evidence suggests that careful characterization of conodont apatite permits robust interpretations of paleocean chemical compositions.

CHEMICAL ELEMENT DISTRIBUTIONS IN CONODONT TEETH

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Many studies now support the interpretation that the conodont animal was an active, marine vertebrate with oral phosphatic structures, large eyes, and fins for swimming. Studies of mineral composition, histology, and morphology in conodont teeth provide important information on biologic function and taxonomic affinity. This study utilizes advances in modern instrumentation to precisely map variations in elemental abundance across conodont teeth for the purpose of identifying function and assisting paleobiologic interpretations. Electron microprobe analysis of well-preserved P1 elements of *Mesogondolella idahoensis lamberti* from the Lower-Middle Permian boundary of West Texas reveals important patterns in element distributions. The crown of the conodont tooth is more mineralized than the basal plate and shows no evidence of calcium or phosphate deficiency in areas of rapid lateral growth that might have been interpreted as white matter. Additionally, the basal plate has higher concentrations of fluorine, iron, potassium, magnesium, strontium, and yttrium, which indicate a different mineral structure and composition. Sodium concentrations are high on oral surfaces in the crown between the parapets and low elsewhere while sulfur concentrations display the opposite pattern. These patterns are independent of the crown-basal plate boundary and indicate chemical differentiation between the oral and aboral surfaces in conodont teeth. This differentiation supports oral exposure of conodont teeth during life, approximates the position at which conodont teeth was embedded in tissue, and indicates functional use as a tooth as opposed to a support structure for soft tissue. These variations in chemical composition support previously interpreted histologic properties of the crown and the basal plate that indicate similarity to enamel and dentine respectively. The variations in calcium, phosphorous, sodium, sulfur, magnesium, and strontium are also comparable to those in modern mammal teeth. Diagenetic studies on 3.9Ma mammal teeth indicate that strontium, magnesium, and sodium are relatively stable elements and do not get significantly enhanced during diagenesis. Accordingly, conodont elements should henceforth be called conodont teeth.

TRACE-ELEMENT MAPPING OF CONODONTS – IMPLICATIONS FOR HISTOLOGY AND FUNCTION

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Microprobe and laser-ablation ICP-MS analyses of suites of early to middle Paleozoic coniform, ramiform, and pectiniform conodont elements were used to construct detailed trace-element maps and transects that permit the complex biogeochemical differentiation of single conodonts to be documented. Such important trace elements as F, Na, Sr, and Ba were measured, together with transition and REE elements. The trace-element maps and transects define clearly concentrations within and variations between individual growth lamella of the basal plate and crown and through zones of white matter, resulting in a distinct 'tree-ring' pattern of elemental zoning. We suggest that some of the chemical abundances and elemental ratios recorded in the conodonts are primary and were preserved during diagenesis. The variation in element abundances may accurately reflect changing biochemical accumulation and enrichment rates through the life of the animal.

One result of the mapping is that the lamella-scale variations in Sr content, which characterize highly crystalline hyaline apatite in the crown, pass unchanged through white matter. This supports previous studies suggesting that white matter is a secondary hard tissue formed from hyaline apatite, preserving in part the original, primary biochemistry of the crown. Another result is that the maps clearly delineate wear/growth and resorption/regeneration surfaces, further supporting our hypothesis that some trace-element zones are a primary, and not diagenetic, record of biochemical uptake by the conodont. We speculate that the chemical zoning and concentrations preserved within the conodonts may (a) reflect episodic sequestering of potentially biotoxic elements present in the surrounding environment; (b) be related functionally to the strength or stability of the teeth; or (c) in the case of biolimiting elements, represent accumulation sites or chemical 'banks' that could be selectively accessed later by resorption, releasing the elements for use by the conodont animal. It is hoped that additional trace-element mapping of conodonts will provide not only more detailed data on coeval ocean chemistry, but also new insights into the paleobiology of this complex and enigmatic group of organisms.

A PRECISE AND ACCURATE SEAWATER SR CURVE FROM LATE CARBONIFEROUS – EARLY PERMIAN CONODONTS

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Stratigraphic sections of the Southern Urals containing abundant and well-preserved fauna for precise biostratigraphic correlation and common instratified volcanic ash beds dated by U-Pb zircon geochronology offer a unique opportunity to constrain a temporally accurate Late Pennsylvanian-Early Permian seawater Sr curve. The $^{87}Sr/^{86}Sr$ compositions of conodonts (biogenic apatite) were measured by high-precision thermal ionization mass spectrometry following rigorous pretreatment protocols, and plotted within an age model calibrated by >10 high-precision U-Pb zircon ash bed ages. The resulting seawater Sr curve shows a significant reduction in data scatter by comparison to earlier curves (Denison et al., 1994; Veizer et al., 1999; Bruckschen et al., 1999), suggesting that our conodont pre-dissolution treatment was highly effective for retrieving the original seawater Sr signal. The relatively flat Late Moscovian through mid-Ghzelian seawater Sr curve of this study is generally consistent with that of Bruckschen et al. (1999). Beginning in the mid-Ghzelian, our data define a decreasing trend in $^{87}Sr/^{86}Sr$ through the mid-Sakmarian. This decrease contrasts with the whole rock carbonate data of Denison et al. (1994), but is similar to that of Veizer et al. (1999) although the slope of the latter curve is significantly steeper. The variation in slope may be an artifact of different biostratigraphic definitions of the basal Sakmarian used for the curves. In the mid-Sakmarian, our stratigraphically highest sample implies an abrupt increase in $^{87}Sr/^{86}Sr$, although the fidelity of this sample as a record of seawater composition requires confirmation. Nonetheless, the highly resolved seawater $^{87}Sr/^{86}Sr$ record obtained for the Late Moscovian through mid-Sakmarian will aid in global carbonate chemostratigraphic correlation and contribute to our understanding of the timing of Late Paleozoic glacial and tectonic events.

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FRASNIAN (UPPER DEVONIAN) CONODONT SUCCESSION AT HORSE SPRING AND CORRELATIVE SECTIONS, CANNING BASIN, WESTERN AUSTRALIA

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The Horse Spring conodont succession in the Canning Basin replicates Zones 6 through 13 of the thirteen-fold Frasnian zonation. Horse Spring, together with other Canning Basin sections, demonstrates the widespread application of the zonation. Furthermore, the recently formalized three-fold subdivision of Zone 13, which has been recognized in the Montagne Noire of southern France, Moroccan Meseta, and northern Ontario, is developed at Horse Spring and other Canning Basin sections. The Canning Basin Frasnian is noteworthy for the high quality of preservation of the conodont faunas, the extremely low CAI values, and the abundance of elements in most collections. The Frasnian in this Western Australian area furnished one of the two case studies used as a basis for the Seddon and Sweet model of depth stratification of conodont biofacies. In contrast, the current study provides evidence for the lateral segregation of conodont communities in the upper surface layer oceanward of the Canning Basin Frasnian reef complex. The emphasis in this research is on the taxonomy of Frasnian *Palmatolepis*, with seven new species recognized. Complete and partial multielement apparatuses have been reconstructed for two of these.

USING CONODONTS AND OTHER FOSSILS TO DETERMINE THE AGE OF MISSOURI'S 38TH PARALLEL STRUCTURES AND SOME "LOST HORIZONS" OF THE OZARK DOME

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The Weaubleau, Decaturville, Crooked Creek, and Avon structures are aligned west to east across Missouri's Ozark dome. The Rampino-Volk hypothesis suggests that they formed as a serial impact. Associated breccias contain fossils redeposited from pre-impact strata and from uncemented ocean-floor sediments. The Weaubleau structure in western Missouri, partly buried by Pennsylvanian clastics, involves deformed Precambrian through middle Mississippian (Osagean) rocks. The marine resurge facies of the "Weaubleau Breccia" contains well-preserved crinoids and blastoids that were redeposited from uncemented Burlington-Keokuk Limestone, plus corals and brachiopods; redeposited conodonts include rare *Colaptoconus* (Early

Ordovician), *Icriodus* (Devonian), and *Palmatolepis* (Late Devonian). Redeposited Mississippian conodonts include Kinderhookian and Osagean *Gnathodus, Polygnathus, Pseudopolygnathus, Siphonodella*, and *Taphrognathus*. The youngest conodonts are common *G. texanus* and rare *T. varians* (late Osagean to Meramecian). Conodonts of these ages typically are mixed together in samples of the resurge breccia. Residual chert from the lower Meramecian Warsaw Formation overlies the breccia and gives an upper limit for the time of impact.

The Decaturville structure, farther east, is eroded down to the middle Lower Ordovician. Its fallback breccia has Middle to Upper Ordovician conodonts redeposited from Mohawkian (*Amorphognathus, Curtognathus, Erismodus, Panderodus, Phragmodus*) and Cincinnatian strata (*Protopanderodus insculptus*).

Little research on breccia fossils has been done at the Crooked Creek structure in central Missouri, but the Early Ordovician conodont *Chosonodina* was found at the same locality as float containing the middle Mississippian brachiopod *Orthotetes keokuk*. Breccia at the Avon structure in eastern Missouri contains the early Late Cambrian phosphatic brachiopod *Angulotreta missouriensis* and Early Devonian macrofossils.

Conodonts from these breccias have a Color Alteration Index of 1 to 1.5, indicating that they have not been affected by high temperature.

Apatite fossils in breccias identify Mohawkian, Cincinnatian, and Devonian strata that were eroded away across most of the Ozark dome after impact. These strata are some of Missouri's "lost horizons."

USING SEQUENCE STRATIGRAPHY TO FIND CONCENTRATIONS OF ORDOVICIAN CONODONTS IN DEEP-WATER SILICICLASTIC ROCKS

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Conodonts from deep water siliciclastic bedding plane surfaces are well known, but finding conodonts on these surfaces is a 'needle in a haystack' problem. Sequence stratigraphic models suggest that when sea level is high, siliciclastic material may be choked in newly created accommodation space, resulting in less sediment being transported to deep water environments. This, in turn, results in deposition of a greater amount of biogenic material relative to siliciclastic detritus. This model explains high concentrations of conodonts on certain bedding surfaces in Lower (Floian) and Upper Ordovician (Sandbian and Katian) deposits at Trail Creek, Idaho and Black Knob Ridge, Oklahoma, USA, respectively. The Floian portion of the Phi Kappa Formation, exposed along Trail Creek Road in central Idaho, preserves a graptolite fauna from the *Didymograptus bifidus* - *Isograptus victoriae* zones. This section also contains a low diversity, high abundance conodont fauna dominated by *Periodon flabellum, Oepikodus* sp,, *O. communis* and uncommon elements of *Protopanderodus, Paroistodus proteus*? and *Drepanodus arcuatus*?. The Sandbian portion exposed at Little Fall Creek in central Idaho, and the Athens Shale from Pratt Ferry, Alabama, USA contain *Hustedograptus teretiusculus* and *Nemagraptus gracilis* zone faunas, respectively. They also preserve a low diversity, high abundance conodont fauna dominated by *Periodon aculeatus*?, *Pygodus anserinus,* and *Drepanodus*?. The Katian deposits at Black Knob Ridge preserves a *Climacograptus bicornis* - *Diplacathograptus caudatus* graptolite zone fauna. This section also preserves a low diversity, high abundance conodont fauna dominated by *Periodon grandis*, *Scabardella*, *Amorphognathus tvaerensis*, with lower abundances of *Icriodella superba*?, *Drepanoistodus suberectus, Protopanderodus liripipus*, and *Oistodus*. *Amorphognathus superbus*? occurs near the base of the *Diplacanthograptus caudatus* Zone. At each locality, intervals interpreted as sea-level highstands contain biostratigraphically significant conodonts that are part of the deepwater community. This approach to finding conodonts in deep water settings should improve the resolution between conodont and graptolite zonations.

UNCERTAINTY INTERVALS FOR UNBINNED SPECIES RICHNESS CURVES: AN EXAMPLE USING ORDOVICIAN CONODONTS

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Species richness for the Paleozoic is typically estimated for relatively coarse time intervals of unequal length (e.g. binned into chrons, biozones, or stages) or at boundary instants separated by the same coarse time intervals. Neither method maximizes biostratigraphic resolving power.

Graphic correlation and automated sequencing algorithms have the potential to build an ordered composite sequence of all available first and last appearance events, by seeking the best fit with field observations from all available stratigraphic sections. We have used a constrained optimization algorithm (CONOP9) to sequence 690 Ordovician conodont taxa from 196 sections (Laurentia: 557 taxa, 149 sections; Baltica: 131 taxa, 31 sections; other regions: 189 taxa, 16 sections). Data for Laurentia and Baltica are sufficient to examine their biodiversity curves separately, explore their individual contributions to global species

richness, and investigate the effects of provinciality on global correlation. The method was validated by comparison with Walter Sweet's (1995) graphic correlation.

Compared with other conodont biodiversity curves for the Ordovician that include between 6 and 80 sequential estimates of species richness, our composite permits up to 1380 individual estimates. The best-fit composite is not a unique solution because there are clusters of events whose internal order cannot be resolved with the current stratigraphic information, so in practice approximately 1000 events and event clusters can be resolved. The full range of equally well-fit solutions provides one means of placing uncertainty intervals around the species richness curves; another option for establishing uncertainty bounds compares composite sequences generated by different measures of fit with the raw field data. The same composite sequence is also used to explore mean taxon longevity through time.

APPLICATION OF THE CONODONT ALTERATION INDEX (CAI) TO THE MARBLE CANYON INTRUSION, SIERRA DIABLO, WEST TEXAS

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The conodont color alteration index (CAI) has been well established using experimentally altered conodonts and comparing them to field indicators of heating history such as vitrinite reflectance and metamorphic mineral assemblages. Most CAI studies have been conducted on a regional scale using outcrop and subsurface well samples to determine the heating histories of various geologic settings, and comparing the results to known CAI values and interpreted temperatures. Only a few researchers have used contact metamorphic areas to conduct CAI studies, and none have been able to compare detailed igneous and metamorphic thermodynamic data to CAI indices from outcrop samples.

Marble Canyon in the Sierra Diablo of West Texas provides a nearly three-dimensional exposure of an igneous intrusion with associated contact metamorphism of surrounding Lower Permian limestones. An unknown factor at the beginning of this study was the shape of the intrusion in the subsurface. Detailed igneous and metamorphic thermodynamics were compared to CAI values collected from field samples around and through the contact metamorphic areole in order to calibrate the index to thermodynamically determined temperatures. Both vertical and horizontal sections were sampled for processing. Recovered conodonts had CAI values ranging from 1.5 to 6. A systematically detailed analysis of the Marble Canyon intrusion and an additional similar analysis of the neighboring Cave Peak intrusion could not be completed because of a rapid, unexpected sale of the Figure 2 Ranch, which resulted in loss of field access before the planned sampling program could be completed. However, sample locations and conodont recoveries were sufficient to create an isotherm map of Marble Canyon using CAI values. The result is a nearly concentric arrangement that follows the exposed portion of the intrusion. The data suggests that heat dissipated rapidly close to a stock-like intrusion, then much more slowly with increasing distance. Comparison of igneous and metamorphic thermodynamics and observed CAI indices support the expected relationship in most cases, but does not allow for direct calibration of the conodont alteration index due in part to changes in geothermal paleogradiants and a lack of higher index (6+) conodonts.

Pander Society Symposium " Mixed-up conodonts: extracting useful information and solving geologic puzzles using stratigraphic leaks and redeposited faunas", presented at the joint meeting of the North-Central and South-Central sections of the Geological Society of America, April 2007, Lawrence, Kansas. James Miller and Stephen Leslie, organizers.

The 40th anniversary of the Pander Society was celebrated at a very successful Pander Society Symposium, held on Friday April 13, 2007 at the University of Kansas, in Lawrence, Kansas (appropriately, it was also the Chief Panderer's 40th anniversary, since he first arrived at the University of Kansas in 1967, to start his Ph.D. on Pennsylvanian conodonts). The symposium topic, one apparently not previously considered by our society, was: **Mixed-Up Conodonts: Extracting Useful Information and Solving Geologic Puzzles Using Stratigraphic Leaks and Redeposited Faunas**; the symposium was held in conjunction with a joint meeting of the North-Central and South-Central sections of the Geological Society of America, and was organized by James Miller and Stephen Leslie.

Jim Miller and Kevin Evans led a one day Pander Society field trip to two meteorite-impact structures in Missouri. Breccia from the impact contains redeposited conodonts (Lr. Ordovician, U. Devonian, Kinderhookian, Osagean; all ages can occur in one sample) and other fossils that allow a rather precise age of impact to be determined. Field trip stops included a look at some of the type Osagean strata, shattered strata in a quarry at the edge of the impact, and resurge breccia with redeposited conodonts and echinoderms. A fresh road cut of Jefferson City Dolomite was also examined, as was the Decaturville impact structure, in Laclede County, where breccias have U. Ordovician conodonts from strata that no longer exist in this part of Missouri.

On the bluffs overlooking the Sac and Osage Rivers, at the type area of the Osagean Stage of the Mississippian Subsystem. Co-leaders Jim Miller (mostly hidden, right of center) and Kevin Evans (far right), address the group, including Carl Rexroad (far left), Tom Thompson, Steve Leslie, and Stig Bergstrom (center). All are trying to keep warm in the cold wind & rain, but at least it quit snowing. (Photo: John Repetski)

Abstracts from the Symposium, as well as conodont-related talks from other sessions held at the University of Kansas, are duplicated (below) in order of presentation).

STRATIGRAPHIC LEAKAGE INTO THE LOWEST MARINE BEDS OF THE LOWER CODROY GROUP (MIDDLE MISSISSIPPIAN), PORT AU PORT PENINSULA, SW NEWFOUNDLAND, CANADA

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The *Diplognathodus* Biozone, characterized by the conodonts *Diplognathodus* and *Clydagnathus* n. spp., occurs in correlative carbonate mound and laminite facies of the basal lower Codroy Group of SW Newfoundland. However, at four localities on the Port au Port Peninsula, thin marine beds below the mound facies contain, in addition to conodonts of the *Diplognathodus* Zone, the conodonts *Gnathodus girtyi*, ?*Mestognathus* sp., and *Vogelgnathus* spp. and the brachiopods *Martinia* spp.

The occurrence of these taxa in the lower Codroy Group is anomalous because elsewhere, the brachiopods in particular, identify younger strata. The four occurrences have since the 1930s, been mostly regarded as secondarily emplaced. However, more recently, lower Codroy Group *Martinia* spp. were interpreted as contemporaneous, being characterized as unreliable guide fossils. Subsequent interpretations, accompanying a hypothesis of hydrothermal vent origin for the overlying mound facies, also argued for primary emplacement for *Martinia* spp. and the sediment in which they occur.

A primary origin, one not involving stratigraphic leakage, is difficult to sustain for these basal sediments and their contained fossils. The lowest marine beds directly overlie and infill a well-developed L. Dev.- E. Miss. paleokarst that includes extensive fissure and cave fillings, features that likely relate to a secondary origin for the *Martinia* beds and their contained fossils.

The lower Codroy Group was recently correlated with the Late Chadian substage of Britain and Ireland using palynoflora. The fact that the conodonts *Gnathodus girtyi* and *Vogelgnathus* spp. are unknown from the Chadian, *Gnathodus girtyi* first appears in the late Early Asbian, and *Vogelgnathus* spp. first appear in the Late Arundian suggests these conodonts were emplaced

secondarily.

Karstification of lower Codroy Goup evaporites, and the L. Chadian to L. Asbian 'age-spread' between the two lowest conodont zones, suggest a erosional hiatus in the lower Codroy Group, similar to one postulated in Nova Scotia. Thus, there was likely time for the creation of a Middle Mississippian 'plumbing' system, for the emplacement of Brigantian sediment and fossils into pre-Mississippian karst below the basal lower Codroy Group. *Martinia* spp. either inhabited this 'plumbing' system, or was washed into it.

REWORKED CONODONTS: TILLS, SINKHOLES, AND TERRA ROSSA

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Conodonts were recovered from several different types of nonmarine sediments into which they were redeposited and were found to provide a variety of useful geologic information. For example, in order to evaluate the potential of conodonts to help refine glacial stratigraphy, samples were collected from one Wisconsin and three Illinoian tills in west-central Indiana. Generically, identifiable conodonts from the Wisconsin till were many times more abundant than those from the Illinoian but were more restricted in the ages represented. The Wisconsin conodonts ranged in age from possible Silurian, as suggested by long-ranging *Panderodus*, to Early Mississippian; the Illinoisan ages were Ordovician into Pennsylvanian. These variations suggest that major subdivisions of the Pleistocene should be recognizable and that there is the possibility of separating smaller units and of determining ice direction based on the rocks represented.

In central Missouri, samples were collected from five more or less vertical Pennsylvanian solution fills and one sink hole in the Burlington Limestone (Mississippian). In the five fills *Gnathodus texanus* dominated and all specimens were compatible with a Middle Mississippian age, strongly suggesting the former presence of the Keokuk Limestone as a phantom formation above the Burlington. The ages of the conodonts from the sinkhole, however, indicate considerable transport, which has not yet been interpreted. Conodonts include specimens of Ordovician (4), Devonian (2), Middle Mississippian (3), and Pennsylvanian (1) age. In north-central Indiana a large sinkhole formed during mid-Tertiary time on Silurian rocks with clays sealing the sink. Conodonts from the red clay show that it was essentially in situ because all the conodonts, including *Pterospathodus*, found in it are present in the underlying bedrock.

One sample was taken from a fresh cut in terra rossa in southern Indiana. It yielded seven Pa elements of *Cavusgnathus* and one M element of *Kladognathus*, both present in the underlying Upper Mississippian limestone. I interpret this sample as having been formed in situ although there is some thought of downhill transport for terra rossa development.

CAN THE REWORKED CONODONTS OF THE NORTH EVANS LIMESTONE (CONODONT BED OF HINDE, 1879) BE BROUGHT TO LIFE TO HELP SOLVE THE GEOLOGICAL PUZZLE OF DEVONIAN EXTINCTIONS?

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At the Appalachian Basin margin in western New York, the change from the Middle Devonian neritic Hamilton Group deposits to the Middle to Upper Devonian dark basin facies of the Genesee Group is abrupt and profound. This is the interval of the diachronous Taghanic Unconformity, marked by the erosion of the upper Hamilton and most of the Tully Limestone; the post-Tully lower Genesee succession (with Leicester Pyrite at its base), onlaps westward, becomes internally condensed, and is also beveled to a feather edge below a still younger erosion surface beneath the mid-Genesee Genundewa Limestone. This strongly telescoped succession is also the interval of the Taghanic Extinction, a major global extinction.

Sandwiched between the Taghanic and sub-Genundewa erosion surfaces is the North Evans Limestone (Conodont Bed of Hinde, 1879) a thin crinoidal lag facies long recognized as a concentrate of conodonts and fish debris. The North Evans spans an interval of some six conodont zones whose representative taxa, known from other horizons in the region, are here missing or present in a range of preservations. The taphonomic age of the North Evans is early Frasnian but the unit is full of Givetian elements, particularly the long-ranging, cosmopolitan *Polygnathus linguiformis*.

Polygnathus linguiformis should be a prime candidate for testing the new biogeochemical techniques reported at the 2006 Pander Symposium. The growth lamella of conodont denticles show fine-scale patterns of trace elements (like 'tree-rings') and oxygen isotopes that appear to be primary (and not modified by diagenesis), thus reflecting biotic response to environmental conditions. If biologically coeval specimens (geochemical groupings) can be recognized in the North Evans by their trace-element patterns, it may be possible to track environmental changes through their counterparts in the Hamilton, Tully, and Leicester.

Oxygen depletion and related chemical changes associated with eustatic sea-level rise are believed to have been the principal trigger of Devonian extinctions. Detecting fluctuations in ocean conditions in the apatite of conodonts will be a challenge for a new generation of paleobiologists. For the North Evans, the new methods could bring life to an old fauna in the effort to solve the puzzle of Devonian extinctions.

EJECTED DEVONIAN TO CAMBRIAN CONODONTS REDEPOSITED IN LATE DEVONIAN ALAMO IMPACT BRECCIA, SOUTHERN NEVADA

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Conodonts ejected by the Late Devonian (early Frasnian, *punctata* Zone, ~382 Ma) Alamo marine impact evidence derivation within a >1.7-km-deep blast crater with a final diameter of 44–65 km. Generally unshattered conodonts contained within small clasts and redeposited in a single fallout lapillistone block, subsequently reworked within the Alamo Breccia by the post-impact megatsunami, were derived from six formations: lower Frasnian part of Guilmette Formation, Lower Silurian part of Laketown Dolostone, Upper Ordovician Ely Springs Dolostone, Middle Ordovician Copenhagen Formation and Antelope Valley Limestone, and Upper Cambrian part of Goodwin or Hales Limestone. Conodont preservation is fortuitously related to clast size as well as to composition, induration, and conodont abundance of the provenance layer and its depth within the crater. Older conodonts have lower CAI values (1–2) than younger ones (3.5–4), indicating that the heat of impact dissipated through formations with depth. The youngest conodonts, which lay on or in unconsolidated sediments just below the seafloor, commonly are broken and poorly preserved. Unencased conodonts or those contained within tiny fragments probably were totally shattered and are unrecoverable. Other well-preserved Ordovician to Frasnian conodonts occur in lithoclasts within the graded megatsunami breccia.

Redeposited impact-derived conodonts may be as excellently preserved as those reworked in turbidites and debris flows derived from an advancing forebulge (e.g., Famennian Lower *marginifera* and Lower *expansa* Zone conodonts in Lower Mississippian Tripon Pass Limestone, Nevada, and McGowan Creek Formation, Idaho), on an offshore carbonate bank (e.g., Upper Devonian, upper tongue of Fenstermaker Wash Formation, Nevada), or in transgressive deposits (e.g., Ordovician to Devonian conodonts in Kinderhookian Bachelor Formation and Famennian Saverton Shale, Missouri). Similarly well-preserved conodonts are also encountered in stratigraphic leaks within sinkholes (e.g., Osagean *anchoralis-latus* Zone conodonts in Frasnian reefs, Germany). On the other hand, indigenous conodonts reworked by wave action in high-energy peritidal settings may be rounded into small sand grains barely recognizable as conodonts (e.g., Pennsylvanian Casper Formation, Wyoming).

CRITICAL STRATIGRAPHIC DATA FROM REWORKED CONODONTS IN IMPACT BRECCIAS ACROSS MISSOURI'S OZARK DOME

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The Weaubleau, Decaturville, and Crooked Creek structures are impact features aligned across Missouri near the 38th parallel. One hypothesis of their origin suggests they were a serial impact. Impact breccias at these structures have reworked conodonts that provide provenance data that are unobtainable using only *in situ* faunas.

Mississippian and Pennsylvanian strata crop out in and around the Weaubleau structure. Breccia at Weaubleau in the western Ozark dome contains common Early Ordovician conodonts, rare latest Devonian conodonts, and abundant Mississippian (Kinderhookian to Osagean) conodonts. Conodonts of all these ages occur in one sample, together with reworked late Osagean to earliest Meramecian crinoids and blastoids. The youngest conodonts are *Gnathodus texanus* and *Taphrognathus varians*. Latest Osagean to Meramecian megafossils occur in chert regolith derived from limestones that formerly covered the breccia. Collectively, these faunas indicate an impact near the Osagean–Meramecian boundary.

The nearby type area of the Osagean Series lacks uppermost Osagean strata, but echinoderms of this age are abundant in breccia at Weaubleau. Impact-generated resurge currents may have blended unconsolidated latest Osagean and early Meramecian crinoid-bearing sediment together with clasts of older strata that were ejected from the impact crater to form the breccia at Weaubleau. The type Osagean is incomplete, most likely because these currents removed part of the stratigraphic record, but it can be reconstructed using reworked fossils.

The Decaturville and Crooked Creek structures in the central Ozark dome are eroded down to the Lower Ordovician. Breccia samples at Decaturville yielded conodonts that occur in Upper Ordovician (Mohawkian and Cincinnatian) strata exposed only east and west of the Ozark dome. Reworked conodonts in the breccia at Decaturville are the only evidence that these strata were deposited in the central Ozark dome.

Crooked Creek is the easternmost impact structure. A single breccia sample contains Early Ordovician conodonts, including *Chosonodina herfurthi*, which is known from only one other locality in Missouri. A float block contains the latest Osagean

brachiopod *Orthotetes keokuk*, suggesting that the time of this impact may be similar to that of the Weaubleau structure.

CONODONTS FROM TARGET BEDROCK AND IMPACT BRECCIAS OF THE HAUGHTON IMPACT STRUCTURE, DEVON ISLAND, NUNAVUT, CANADA

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Preliminary sampling of carbonate bedrock (n=5) near, and melt breccia clasts (n=8) within the Haughton impact structure (Tertiary), Devon Island, Canada (75.2 deg. N. Lat.; 89.4 deg. W. Long.) yielded conodonts that provide new data on their age and thermal history. Most of the target bedrock samples produced conodonts that are indicative only of Late Ordovician age; for some, a Silurian age cannot be discounted. The age range thus is consistent with the Allen Bay Formation (Upper Ordovician-Lower Silurian) as mapped in the area. Most of the samples of clasts from breccias also fall within this age range; however, some contain faunas of latest Early to earliest Middle Ordovician age, consistent with the ages of some of the underlying units, e.g., the Eleanor River Fm., displaced as ejecta and as parts of the central uplift.

Conodont color alteration index (CAI) values in the regional bedrock are about 1.5, indicating maximum post-depositional, long-term heating in the approximate range of 50-90 degrees C. Some samples contain conodont elements having higher CAI values - up to 4. Some of these samples also contain co-occurring conodonts having several different CAI values, and some of the elements in these samples display surface features characteristic of the effects of contact with hydrothermal conditions. These surface features, and the co-occurrence of multiple within-sample CAI values are another of the many indicators of hydrothermal activity associated with the impact. Conodonts may provide some additional constraints on some of the thermal history parameters of this event. For example, one larger carbonate clast (~25cm x 20cm x 10cm) was split into two samples, the outer edges and the center of the clast, which were processed separately. CAI of conodonts in the outer sample range from 3.5 to 4, whereas most elements from the inner part of the clast range from 2 to 3, demonstrating the insulation effect of the poor heat conductivity of rock. Splits of these two samples processed by one of us (PL) using biological marker maturity parameters (pregnane/sterane and tricyclic terpane/hopane) also showed this insulation effect.

TELYCHIAN (LLANDOVERY, SILURIAN) CONODONTS FROM A NEW STRATIGRAPHIC UNIT IN THE CHIMNEYHILL SUBGROUP, WEST CARNEY HUNTON FIELD, NORTH-CENTRAL OKLAHOMA

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Twenty-eight cores from the West Carney Hunton Field (Logan and Lincoln Counties, Oklahoma) yielded late Llandovery (Silurian) conodont faunas from the Chimneyhill Subgroup of the Hunton Group. Five cores yielded late Llandovery (Telychian) conodonts from a previously unknown stratigraphic unit that lies between the Cochrane (Aeronian) and Clarita (Wenlock) formations. The main part of the field is a reef-dominated carbonate shoal consisting of reef facies in the Cochrane and lagoonal facies in both the Cochrane and the new Telychian unit. The lagoonal facies is a complex of pentamerid brachiopod mounds flanked by crinoid-, brachiopod- and/or coral-dominated grainstones. The Telychian lagoonal facies fauna includes *Pterospathodus a. amorphognathoides*, *Pt. a. lennarti*, *Pt. a. angulatus*, *Pt. celloni*, *Ozarkodina p. polinclinata*, *Ozarkodina p. estonica*, *Aspelundia fluegeli* and *Asp. expansa*. Species of *Pterospathodus* and *Ozarkodina* allow recognition of the Telychian *Pt. eopennatus* through *Pt. a. amorphognathoides* zones of Mannik, which are based on sections in the Baltic region. Distally two cores in nodular shaly limestones, dolostones, and shale yield deeper water faunas containing *Aulacognathus bullatus*, *Aul. kuehni*, *Aul. latus*, and *Oulodus sigmoideus*. We recognize three successive biozones based on species of *Aulacognathus* (*Aul. bullatus*, *Aul. kuehni*, and *Aul. latus*). The lack of *Pterospathodus* in the deeper water fauna makes it difficult to correlate this fauna to the lagoonal facies and to the standard Silurian conodont zonation. The occurrence of *Pt. a. amorphognathoides* at the top of the deeper water cores and the presence of *Oz. polinclinata* in the lagoonal facies indicates they are contemporaneous. Many of the species of these Telychian faunas have been found previously only as elements reworked into Late Silurian strata, but the strata from which they originated were unknown.

CONODONTS FROM THE WINNESHIEK LAGERSTÄTTE, ST. PETER SANDSTONE (ORDOVICIAN) OF NORTHEAST IOWA

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The Winneshiek Lagerstätte is a recently discovered Middle Ordovician Konservat-Lagerstätte from a new shale unit within the St. Peter Sandstone exposed near Decorah in northeast Iowa, USA. Abundant well-preserved conodonts form a prominent component of the Lagerstätte. Although coniform elements occur, the conodont biota from the Winneshiek fauna primarily comprises taxa grouped within the Chirognathidae and Coleodontidae. Conodonts from the fauna are preserved as both separated elements and natural assemblages. To date, at least 4 or 5 different kinds of partial or complete assemblages have been

recovered, including the first known apparatuses of the enigmatic coleodontids, which are comprised of 6 elements: two pairs of coarsely denticulated *Archeognathus* elements and one pair of elongated finely denticulated *Coleodus* elements. These associations indicate that *Archeognathus* and *Coleodus* are synonymous. Conodont assemblages associated with high-carbon soft tissue remains also occur in this fauna. Although more confident evidence is still required, these specimens may represent parts of early conodont animals. Three fossil preservation characteristics are noteworthy in the conodont fauna. First, conodont elements from the fauna commonly preserve complete basal structures. Second, some conodont elements from this fauna are preserved with bromalitic materials, indicating they may have experienced the digestive tracts of carnivores such as eurypterids. Detailed studies on these materials will reveal additional information relevant to paleoecologic, taphonomic, and systematic interpretation. Third, conodont elements from the Winneshiek Lagerstätte display different colors, ranging from amber to white. In most cases, conodont color lightening is associated with varying degrees of dissolution in which conodont basal structures or even whole elements are dissolved, leaving a clearly defined basal void or element mold. Because of the color variation, the conodont alteration index (CAI) is not directly applicable. These variations are probably related to the different degrees of decomposition from anaerobic bacteria, or other diagenetic or biologic processes. Some of the white-colored elements may be bromalites.

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GLOBAL ‘DIGITAL' CORRELATION OF MAJOR PENNSYLVANIAN CYCLOTHEMS FROM MIDCONTINENT U.S. TO RUSSIA AND UKRAINE

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The succession of major Midcontinent Pennsylvanian marine cyclothems has been correlated with those in the Illinois and Appalachian basins and the north Texas shelf by means of the succession of similar conodont faunas in their highstand ‘core' shales. The long-standing difficulty of correlating Pennsylvanian strata globally among different faunal regions, where most conodonts appear to be provincial, is being resolved by using the few major cyclothems that had highstands when certain species achieved more global distribution than usual as primary tie-lines. In the late Desmoinesian—early Virgilian [late Moscovian—early Gzhelian] succession in the Midcontinent, these cyclothems are correlated by conodont species in common with certain cyclothems in Russia (Moscow Basin) and Ukraine (Donets Basin), and the remaining cyclothems fit ‘digitally' into the framework by position and scale. For example, late Desmoinesian *Swadelina* occurs in the major Altamont and Lost Branch cyclothems, in major Donets cyclothems N3/1 and N3/3, and in the major Voskresensk cyclothem in Russia. Below the Voskresensk, the major mid-Suvorovo cyclothem contains *Streptognathodus subexcelsus*, which occurs also in N3/1, thus allowing correlation of this succession of two major cyclothems among the three regions. Early Missourian *S. cancellosus* appears in the major Swope cyclothem and in the major Mid-Neverovo cyclothem in Russia. Above the Swope, *S. confragus* appears in the major Dennis cyclothem and in major Donets cyclothem O2. Combining these correlations lines up these two major cyclothems among the 3 regions [Swope—Mid-Neverovo—O1, Dennis—Upper-Neverovo—O2], and results in positional correlation of a similar number of cyclothems of similar scales between them and the *Swadelina*-bearing cyclothems below. Higher, in the early Virgilian, first appearance of *Idiognathodus simulator [s.s.]* allows correlation of the Oread cyclothem with the Upper Rusavkino cyclothem in Russia and Donets cyclothem O6, which results in positional correlation of a similar number of major cyclothems between this cyclothem and the two major lower Missourian cyclothems below. This procedure should lead to more precise global correlation of the Pennsylvanian, and perhaps ultimately to better calibration of the Pennsylvanian time scale.

LITHOSTRATIGRAPHY AND SEQUENCE STRATIGRAPHY OF THE SHAWNEE GROUP (VIRGILIAN, PENNSYLVANIAN) IN SOUTHEASTERN KANSAS

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Cyclothemic and megacyclothemic scale depositional sequences are readily identified in outcrops in southeastern Kansas. This study further differentiated these cyclothemic-scale depositional sequences of the Shawnee Group (Virgilian, Pennsylvanian). Outcrops were measured, sampled and described from various sites in a north-northeasterly, south-southwesterly trending outcrop belt situated in portions of Chautauqua, Elk, Greenwood and Woodson counties. These outcrop observations, paleontologic **(primarily conodont**) information, hand sample and thin section photomicrographic data, and 52 prepared cross-sections were used for final analysis. After all the available data was compiled, rock units at each location were organized within a specific sequence-stratigraphic framework (systems tract and sea level curve). A composite stratigraphic cross-section was prepared based on the interpolation of important sequence stratigraphic bounding surfaces and the interpretation of the depositional environment.

The Shawnee Group consists of six complete transgressive-regressive cycles of sedimentation forming four megacyclothems, as defined by Heckel in 1977. The Upper Lawrence (below the Toronto Limestone), Snyderville Shale, Kanwaka Shale, Tecumseh Shale, Calhoun Shale, Iowa Point Shale and the Severy Shale represent lowstand deposits. Four cycles had sufficient water depths at or near highstand necessary to form definite marine condensed sections. These condensed sections are represented by black shales, typically very phosphatic, **containing an abundance and diversity of conodonts**. Maximum flooding events represented by the phosphatic "core" shales include the Heebner Shale (Oread Limestone Formation,) the Queen Hill Shale (Lecompton Limestone Formation,) Larsh-Burroak (Deer Creek Limestone Formation,) and finally, the Holt Shale (Topeka Limestone Formation). The Holt Shale was previously believed to be absent in southeastern Kansas. These are highstand deposits formed during maximum transgression.

LATE PALEOZOIC CONODONT SEQUENCE BIOSTRATIGRAPHY OF WESTERN NORTH AMERICA

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Many of the classical Late Paleozoic cyclothems of Midcontinent North America are characterized by unique and often abundant core shale conodont faunas that allow for easy recognition of individual cycles. Application of the Midcontinent conodont sequence biostratigraphic timescale to basins of western North America, however, has yielded only mixed results. In the thicker, carbonate-dominated western sections, a Midcontinent-type core shale is poorly developed or absent and a corresponding conodont fauna more difficult to obtain. Conodont faunas that are recovered from the strongly cyclical carbonates generally come from shallower-water facies than the core shale and faunal differences owing to ecology make identification of the faunas of individual Midcontinent cycles problematic. At least nine Midcontinent cycles can be recognized in Moscovian and Kasimovian strata of the Paradox basin (eastern Utah) on the basis of their constituent conodonts, thereby enabling correlation of several other cycles by extrapolation. The late Moscovian-Asselian sea level history of the eastern Ely basin (eastern Nevada) has been greatly improved through comparison with the Midcontinent. Rapid sedimentation and low conodont yields complicate correlations in the Oquirrh basin (northern Utah). The exquisitely exposed Moscovian-Kasimovian section at Arrow Canyon (Bird Spring trough, southern Nevada) contains only a few conodont-bearing horizons and these are dominated by generalized idiognathodids. Conodont faunas in Moscovian-Asselian strata in the Pedregosa basin in southwest New Mexico (Horquilla Limestone) are comparable to selected Midcontinent faunas and permit recognition of the Carboniferous-Permian boundary. Deep-water carbonate turbidites of the Keeler Canyon basin of southeastern California yield poorly preserved conodont elements that permit only tentative correlation to the Midcontinent. This preliminary research suggests that a modified scheme of conodont sequence biostratigraphic units may need to be developed for the western United States, which can then be tied to Midcontinent sequence biostratigraphic timescale as the conodont faunas permit.

CONODONT BIOSTRATIGRAPHY OF THE VIRGILIAN STAGE, KANSAS

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Conodont faunas of the uppermost Pennsylvanian are dominated by species loosely ascribed to the genera *Idiognathodus* and *Streptognathodus*. These genera have been poorly understood and generally treated as represented by a few long-ranging species. Detailed examination of these "species" shows that they are clades of several distinct species and can be used to differentiate most of the cycles that make up the Virgilian Stage in Kansas and Missouri. Specifically, the conodont clades characterized by asymmetric paired Pa elements as exemplified by *Idiognathodus simulator* and *Streptognathodus bellus* are very useful. *Streptognathodus bellus* gave rise to a succession of species, one of which defines the internationally recognized base of the Permian, *Streptognathodus isolatus*. In Kansas, *Streptognathodus isolatus* first occurs at the base of the Bennett Shale Member of the Red Eagle Limestone. The proposed base of the international Gzhelian Stage is the first occurrence of *Idiognathodus simulator (sensu strictu)* which occurs in its type stratum, the Heebner Shale Member of the Oread Limestone. Most maximum flooding surfaces appear to contain a different species of this clade, distinguished by apparatuses with very asymmetric paired Pa elements. The conodont faunas of the Douglas, Shawnee, Wabaunsee, Admire and lower Council Grove Groups, which constitute the uppermost Pennsylvanian or North American "Virgilian" Stage, are reviewed.

CORRELATION OF MIDDLE CHEROKEE GROUP CYCLOTHEMS ACROSS NORTHERN MIDCONTINENT USING *GONDOLELLA* AS A MARKER FOR THE UPPER TIAWAH CYCLOTHEM

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The Cherokee Group has long been a source of coal and petroleum in the Midcontinent and is now of interest for coal bed methane. Previous lithostratigraphic correlations of coals have proven unreliable because of their dependence on coal bed thicknesses and inferred positions of discontinuous sandstones. New results from middle Cherokee strata [from the base of the Wier-Pittsburg coal up to the base of the Croweburg coal of the widespread Verdigris cyclothem] have correlated marine

cyclothems in cores and outcrops from Oklahoma to Iowa, using the distinctive conodont genus *Gondolella*. This genus is known only from certain offshore marine shales, and occurs in only one marine unit between the Inola cyclothem in the lower Cherokee and the Verdigris cyclothem in the upper Cherokee.

The type Tiawah Limestone near Claremore, Oklahoma, is part of two cyclothems: the Lower Tiawah cyclothem includes the thin Tebo Coal at the base, the overlying conodont-rich shale and the lower part of the Tiawah Limestone. Above the shallow-water facies in the middle of the Tiawah Limestone, the Upper Tiawah cyclothem includes the top of the Tiawah Limestone and the overlying black shale containing *Gondolella*, which also occurs above the Scammon Coal of Kansas.

In the type area of the Tebo Coal near Montrose, Missouri, the *Gondolella*-bearing black shale lies above an "unnamed" coal above the Tiawah Limestone and type Tebo Coal. This coal was left unnamed because it is overlain by a thin sandstone, apparently misidentified as Chelsea [an Oklahoma term], which underlies the type Scammon Coal in Kansas. This coal, however, represents the base of the Upper Tiawah cyclothem and is more likely the Scammon Coal equivalent, while the type Tebo coal and entire Tiawah Limestone here represent the Lower Tiawah cyclothem.

In northeastern Kansas, the *Gondolella* zone was found in two cores in black shale directly above a coal bed identified as Tebo, which thus more likely is the Scammon, as it is part of the Upper Tiawah cyclothem. The *Gondolella* zone was found in Iowa in black shale some distance above the Carruthers Coal, which had been correlated with the Tebo Coal of Missouri using palynology, but may be younger than the Tebo, and equivalent to the Scammon.

CONODONT BIOSTRATIGRAPHY IN RELATION TO CYCLOTHEM CORRELATION OF THE LOWER CHEROKEE GROUP (MIDDLE PENNSYLVANIAN), OKLAHOMA TO IOWA

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Cyclothems in the Middle Pennsylvanian Cherokee Group have a history of difficult correlations and nomenclatural problems. Recent work recognized 17 separate named cycles of marine transgression and regression (cyclothems) in the lower Cherokee Group from the Arkoma Basin margin in east-central Oklahoma to the Kansas-Oklahoma border area. Several of the more major cyclothems are characterized by distinctive conodont morphotypes. More recent work has identified similar successions of morphotypes in Kansas, Missouri, and Iowa. Four of the more major cyclothems in the lower Cherokee seem to be regionally extensive across the Midcontinent, in ascending order: McCurtain, Doneley, Inola, and post-Wainwright. In Oklahoma, the McCurtain cyclothem contains *Idiognathodus* cf. *praeobliquus*, which is found above "Riverton" coals in cores in southeastern Kansas and the Forest City Basin. The Doneley cyclothem contains *I.* cf. *obliquus*, which is found in a core from the Forest City Basin, and above the Cliffland coal in Iowa. The Inola cyclothem contains *I.* cf. *podolskensis*, which is found in the type Hackberry Branch (formerly "Seville") Limestone and above the "Weir C" coal (of the Weir Formation) in Missouri, in a core from the Forest City Basin, and above a middle Laddsdale coal in Iowa. From these observations, the McCurtain cyclothem may include a post-Riverton marine unit, the Doneley cyclothem may include the post-Cliffland marine zone of Iowa, and the Inola cyclothem may include the Hackberry Branch Limestone, a marine zone in the Weir Formation, and a middle Laddsdale coal cycle. In Oklahoma, all *Idiognathodus* forms from the post-Wainwright cyclothem have fewer, coarser ridges on their Pa elements than do older Cherokee conodonts. Similar conodonts above an upper Laddsdale coal in Iowa suggest correlation with the post-Wainwright cyclothem, extending this significant faunal change northward. At the base of the section, the Atokan genus *Idiognathoides* occurs low in a core from the Forest City Basin. Biostratigraphic correlation of extensive marine cyclothems resolves some confusion in Cherokee stratigraphy, and, combined with wire-line log and seismic data, should help establish the sequence stratigraphy and a unifying nomenclature for the Midcontinent Cherokee Group.

Paper presented in session "Roger L. Kaesler—Scientist and Editor: His Contributions to Paleontology through Research and the *Treatise on Invertebrate Paleontology*" at the joint meeting of the North-Central and South-Central sections of the Geological Society of America, April 2007, Lawrence, Kansas

ROGER KAESLER'S 'ACCIDENTAL' CONODONT STUDENT: A TRIBUTE TO A CAREFUL AND CARING 'DOKTOR VATER'

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After I came to the University of Kansas in 1967 to work with R.C. Moore on crinoid columnals and fragmentary echinoderm remains, I began to have doubts about applying non-zoological, parataxa classifications to such fossils. Fortunately, I was able to convince Prof. Curt Teichert of my interest in conodonts, a group with parallel taxonomic problems. Roger Kaesler taught micropaleontology at KU and so somewhat accidentally, I became his Ph.D. student.

Roger was a tall, lean and meticulous man, with a wry sense of humor and with a neat, almost clinical, elongate office/laboratory. Because of his own quantitative ‘bent' and because he had applied biometric methods in his Ph.D. study of the paleoecology of foraminifera of Todos Santos Bay, Mexico, Roger ‘encouraged' me to apply similar methods to measure the environmental controls on conodonts in the Late Pennsylvanian Shawnee Group.

When, after barely a year as his student, I told Roger that I couldn't afford to stay at KU, he strongly supported my alternate plan of going to Philipps University in Marburg, Germany to work under Professors Maurits Lindström and Willi Ziegler. With his support, I won (and miraculously was able to keep) both NSF and DAAD fellowships, spending an invaluable year studying Kansas conodonts with the masters.

Roger set high standards, allowed great independence, but was both protective and helpful, as the situation demanded. Early on, he temporarily stopped my dissertation proposal defence to prevent me from being caught between competing committee members. While I was in Germany, he had my data transferred to punch cards, probably taking the card deck for computer analysis himself, before sending me the results for evaluation. Later, he likely influenced publication of my work in its entirety by KU.

Ronald Taylor, an ostracode specialist, and I, a conodont worker, were apparently Roger's first Ph.D. students, graduating in 1972. At the time, Roger told me he didn't think he understood conodonts sufficiently to confidently supervise future conodont students; nevertheless, my ability to demonstrate that Pennsylvanian conodonts were strongly environmentally controlled, my reconstruction of Pennsylvanian conodont apparatuses, as well as my application of multielement taxonomy to Pennsylvanian conodonts, all firsts, were in large measure due to him.

Papers presented in Stratigraphy (Poster) session of the joint meeting of the North-Central and South-Central sections of the Geological Society of America, April 2007, Lawrence, Kansas

INTEGRATED BIOSTRATIGRAPHY OF CONODONTS, FORAMINIFERS AND RADIOLARIANS FROM THE UPPERMOST GUADALUPIAN (MIDDLE PERMIAN) IN THE APACHE MOUNTAINS, WEST TEXAS

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A continuous section in the Apache Mountains of West Texas containing an uppermost Bell Canyon (Guadalupian) stratigraphic succession and overlain by the Castile Formation (Lopingian, Upper Permian) was recently described in Lambert et al. (2002). Additional study of this section has revealed that biostratigraphically equivalent strata to the upper part of the Lamar and Reef Trail members (as defined in the Guadalupe Mountains) are present. The upper part of the Lamar equivalent strata contains the late Middle Permian fusulinacean *Paradoxiella pratti*, and the Reef Trail equivalent contains *Paraboultonia splendens*. A thick debris flow between these two intervals contains the fusulinaceans *Codonofusiella extensa*, *Yabeina texana*, *Reichelina lamarensis*, and fragments of *Polydiexodina*. Small foraminifers are represented by the calcareous species *Pseudohemigordius incredibilis* throughout the succession, and the agglutinated *Reophax* and *Ammobaculites*-type forms in the lower part of the Reef Trail equivalent. Some of these species of fusulinaceans and small foraminifers are known in the Tansill Formation of Dark Canyon in the Guadalupe Mountains. The conodonts *Jinogondolella postserrata* and *J. shannoni* are present in the Lamar equivalent beds. In the Reef Trail equivalent the conodont succession is *Jinogondolella altudaensis*, *J. crofti*, transitional forms from *J. altudaensis* to *Clarkina postbitteri hongshuiensis*, and *C. postbitteri hongshuiensis*. The latter subspecies occurs at the top of the Reef Trail equivalent succession immediately below the basal part of the Castile Formation and is the marker for the terminal Guadalupian at the Lopingian GSSP in China. Radiolarians present at several levels in this succession include *Follicucullus scholasticus* and *Pseudoalbaillella* aff. *P. fusiformis* in the Lamar and Reef Trail equivalents, and *Grandetortura* aff. *G. nipponica*, *Cauletella manica*, *Follicucullus charveti*, *F. orthogonus*, and *Albaillella yamakitai* in the Reef Trail. The latter species has been proposed as a marker for the Guadalupian/Lopingian boundary based on radiolarians, but occurs below this boundary in the Apaches as based on conodonts that define the boundary.

BIOSTRATIGRAPHIC SIGNIFICANCE OF A NEW POTENTIAL KEY REFERENCE SECTION FOR THE LATEST GUADALUPIAN REEF TRAIL MEMBER OF THE BELL CANYON FORMATION (MIDDLE PERMIAN), WEST TEXAS

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The Reef Trail Member (Bell Canyon Formation, Guadalupian) was established in 1999 for the "post-Lamar beds" of King (1948), the youngest unit of the Middle Permian succession in West Texas. The type section was designated in a slope setting close to the Capitan Reef near the entrance to McKittrick Canyon in Guadalupe Mountains National Park. Before its formal designation, the Reef Trail unit was recognized by many workers because of the distinctive nature of its stratigraphic succession that begins with a recessively weathering siliciclastic unit above a series of limestone beds forming the top of the Lamar Limestone Member. At the type locality, the lower part of the Reef Trail contains several debris flows bearing the fusulinacean *Paraboultonia splendens* and the succession ends in a series of thinly bedded silty limestone beds. The upper part of the Reef Trail Member and its contact with the Castile Formation is not exposed at the type locality, but was described from a pair of low hills nearly 2 miles from McKittrick Canyon on private land. A continuous section of the Lamar and Reef Trail members, overlain by the Castile Formation (Lopingian), has recently been discovered in the Patterson Hills west of the Guadalupe Mountains, but within the national park. Approximately 18 meters of Lamar and 42 meters of Reef Trail contain an upper Middle Permian fusulinacean succession with scarce *Yabeina texana* in the basal Lamar beds, abundant *Reichelina lamarensis* in the upper Lamar beds, and *Paraboultonia splendens*/*Codonofusiella (Lantschichites)* sp. in the Reef Trail beds. The conodont *Jinogondolella postserrata* is present in the Lamar beds, *Jinogondolella altudaensis* in the Reef Trail beds, and *Jinogondolella crofti* with transitional forms from *J. altudaensis* to *Clarkina postbitteri hongshuiensis* (the marker for the terminal Guadalupian at the Lopingian GSSP in China) just below the basal Castile. Small recrystallized ammonoids are present at the top of the Lamar beds and at several horizons through the Reef Trail: however, none have clearly defined sutures. Radiolarians are present in the succession with *Follicucullus scholasticus* in the Lamar and Reef Trail members and upper Reef Trail beds containing *Albaillella yamakitai*, *Pseudoalbaillella fusiformis*, *Copiellintra* sp., and stauraxon radiolarians.

REVISED CONODONT-, GRAPTOLITE-, AND CHITINOZOA-BASED SILURIAN COMPOSITE DEVELOPED USING GRAPHIC CORRELATION AIDS NEW CALIBRATION OF CURRENT SILURIAN CHRONOSTRATIGRAPHY

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Little agreement exists about the durations of epochs and ages in most Silurian time scales developed since 1989. Reasons for the lack of consensus include the use of newly determined isotopic dates for the various time scales, differences in results of the two radiometric dating methods most commonly used since 1990, Mass Spectromic Isotope Dilution (MSID) and Sensitive High Resolution Ion Micro-Probe (SHRIMP), the absence of any stratigraphic units with isotopic dates at/near the Global Boundary Stratotype Section and Point in any Silurian boundary stratotype section, and thus, the necessity of interpolation to calibrate Silurian chronostratigraphy. In order to develop a revised calibration of Silurian chronostratigraphy that addresses the reasons for those differences, since the limited choice of isotopic dates remains the same, we recommend that the method of interpolation be changed. Standard Time Units (STUs), units that represent equal rock thickness and also equal time (at least conceptually), are used as chrons for interpolation instead of graptolite zones. The STUs are based on the composite standard units (CSUs) which comprise a recently revised Silurian composite standard (CS) developed using graphic correlation on range-data of more than 450 species of conodonts, graptolites, and chitinozoa in over 60 stratigraphic sections in North America and Europe. Since the Silurian CS currently includes only Telychian through lower Devonian stratigraphic sections, durations for the Rhuddanian and Aeronian can only be approximated. A new Silurian time scale is developed by calibrating Silurian chronostratigraphy based on STUs and isotopic dates for rocks obtained mainly by using the MSID-dating method (the method used to determine the isotope dates used for the Silurian by the International Commission on Stratigraphy), rather than isotope dates obtained using the SHRIMP-dating method. The new Silurian time scale recognizes the following durations of Silurian epochs: Pridoli, 3.3 Ma; Ludlow, 3.2 Ma; Wenlock, 4.85 Ma; and Llandovery, 13.85 Ma. Durations of Silurian ages are: Ludfordian, 2.4 Ma; Gorstian 0.8 Ma; Homerian, 2.7 Ma; Sheinwoodian, 2.15 Ma; Telychian, 8.45 Ma; Aeronian, 3.5 Ma; and Rhuddanian, 1.9 Ma.

Paper presented in the Paleontology (Poster) session of the joint meeting of the North-Central and South-Central sections of the Geological Society of America, April 2007, Lawrence, Kansas

THE USE OF SEQUENCE STRATIGRAPHY TO PREDICT THE DISTRIBUTION OF CONODONTS IN THE FAYETTEVILLE SHALE, NORTHERN ARKANSAS

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The Late Mississippian Fayetteville Shale is a dark siliciclastic unit that is exposed in northern Arkansas. The sequence stratigraphy of this unit is known. We used this published sequence stratigraphic model to more fully test the idea that it is

possible to use sequence stratigraphy to predict where conodonts occur in significant abundance on shale surfaces in deeper water siliciclastic units. A total of 12 samples were collected 1.75 miles south of Marshall, AR from a northeast-facing road cut exposure of the Fayetteville Shale on US Highway 65. Two horizons that were previously described as flooding surfaces, and which we interpret to be a maximum flooding surface and a parasequence top flooding surface, were collected. The other samples were collected at random intervals throughout the formation. All samples were dark grey shale. The surface of all shale samples were examined under a binocular microscope for conodonts. Conodonts were common in the samples that were collected from flooding surfaces and absent in all other samples. We interpret the results of this study as support for the idea that sediment starvation occurred in intervals that represent flooding, and that higher sedimentation rates in the other samples diluted the conodont abundance. These results suggest that careful sequence stratigraphic analysis is a powerful tool in predicting where biostratigraphically significant microfossils concentrations occur within deeper water siliciclastic rocks.

Paper presented in Undergraduate Research (Poster) session of the joint meeting of the North-Central and South-Central sections of the Geological Society of America, April 2007, Lawrence, Kansas

EVIDENCE FOR INCISEMENT OF THE DEVONIAN CLIFTY FORMATION INTO THE ORDOVICIAN EVERTON FORMATION IN NORTHWEST, ARKANSAS: IMPLICATION FOR SEA-LEVEL AND PALEOENVIRONMENTAL INTERPRETATIONS

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In outcrops along the southern portion of Beaver Lake (Northwest Arkansas), the Middle Devonian Clifty Formation disconformably overlies the Middle Ordovician Everton Formation. The Everton Formation is a mixed carbonate and clastic unit interpreted as representing shallow marine environments on the southern cratonic margin of Laurentia. The Everton Formation is identified from a conodont fauna that includes *Paraprioniodus costatus* and *Multioistodus subdentatus*. This fauna is indicative of the Whiterockian Everton Formation in Arkansas. Recent fieldwork revealed incisement by a coarse-grained sandstone into the top of the Everton Formation. Precise age of the overlying clastic unit is not known due to its poor fossil content, but is presumed to be Clifty Formation based on its textural/mineralogical similarity to known outcrops of Clifty Formation in northwest Arkansas. Incision into the Everton Formation supports the idea that regional base level at the time of Clifty deposition was at least 4m lower than the top of the Everton Formation. This supports previous interpretations based on facies analysis that the Clifty Formation represents a range of depositional settings from subaerial to shallow marine environments. The paleoshore of the southern craton margin during Clifty Formation deposition must have been in the vicinity of the Beaver Lake study areas.

Upcoming Conodont Meetings:

17-20 August, 2007- WOGOGOB 2007 (Working Group on Ordovician Geology Of Baltoscandia) – Rättvik, Siljan District, Sweden

The 9th WOGOGOB meeting will take place at Rättvik, Siljan District, on August 17-20, 2007, the 20th anniversary of WOGOGOB. Two days for technical sessions are scheduled (18 – 19 August). A pre-conference day excursion (17th August) will visit the Siljan area, and a two day post-conference excursion (19th-20th August) will go to Jämtland. The meeting is held in collaboration with IGCP project 503, Ordovician Palaeogeography and Palaeoclimate.

Call for abstracts. Abstract on any aspect of Ordovician geology and palaeontology of Baltoscandia were due by **March 19th, 2007**. Abstracts and field guides will be published in a volume of the Bulletin of the Swedish Geological Survey.

Please visit our homepage http://www.palaeontology.geo.uu.se/Mainpages/WOGOGOB/Layout.htm for details and second circular.

Welcome to Siljan in August! (submitted by Linda Wickström)

September 7-18, 2007: Joint meeting of SDS and IGCP 499 in Nevada (U.S.A.).

The 2007 business meeting of the Subcommission on Devonian Stratigraphy (SDS) and the business meeting of IGCP 499 will be held in Eureka, Nevada (U.S.A.). A seven day pre-meeting field trip is scheduled to depart from Las Vegas and end in Eureka prior to the meeting. The main topics will be (a) Rapid Global Change in the Devonian and (b) sea level curve (c) Devonian land-sea interactions (d) as well as other proposals to be announced. There will be three days for the presentation of papers and posters. Any questions may be directed to the coordinator of the meeting, Jeff Over (over@geneseo.edu). There is also a link on the conference website:

http://www.geneseo.edu/CMS/display.php?dpt=frasnian. It is expected that many SDS members and IGCP 499 members will participate in the conference.

You are invited to attend this meeting !! Further information may be obtained from the IGCP 499 website (http://www.senckenberg.de/igcp-499). (submitted by Peter Königshof)

April 24-25, 2008, Pander Society Symposium to be held in conjunction with the North-Central section of the Geological Society of America, Evansville, Indiana, USA (Field trip, April 26).

Theme: Conodont Biostratigraphy and Correlation of Paleozoic-Early Mesozoic Records of Environmental Change

Conodont biostratigraphy provides the temporal control for calibrating lithic, geochemical and paleomagnetic proxies of regional and global environmental change in deep time. The theme of the 2008 Pander Society Symposium will focus on developments in conodont biostratigraphy that provide correlations permitting recognition and of regional and global signatures of paleoceanographic, paleoclimatic, and biotic change during the Paleozoic and early Mesozoic.

(submitted by Jed Day, symposium organizer)

A one day trip entitled "Aspects of Pennsylvanian stratigraphy, sedimentation, and conodonts, southwestern Indiana", organized by Carl Rexroad, will be run on April 26th with assistance from anyone able to help.
Two mines in the Desmoinesian will be visited, one in which we can get up close and personal, to collect from a couple of black shale/limestone sequences, and another that likely will be mostly comparing sequences, without getting mashed by Euclid trucks. Another mine is a possibility, but we will also visit some more regular outcrops (?Morrowan, and possibly other Desmoinesian units), to have a little more stratigraphic variety for collecting.

(submitted by Carl Rexroad, field trip organizer)

June 4-11, 2009, Cagliari, Sardinia, Italy; A Silurian Field Meeting: Time and Life in the Silurian, A Multidisciplinary Approach

The International Subcommission on Silurian Stratigraphy (ISSS) Field Meeting 2009 will take place in Sardinia, Italy from June 4th to 11th, 2009. All Silurian workers are welcome to join the meeting.
The scientific sessions and the Subcommission business meeting will held in Cagliari. Any contribution on Silurian stratigraphy, palaeoecology and palaeogeography is welcome, but the emphasis will be on integrated multidisciplinary studies on Silurian rocks and fossil biota.
A post-conference fieldtrip (probably four days) is scheduled. The field trip will start and finish in Cagliari and will be focussed on relatively deep-water calcareous and black shale facies. Hirnantian and Lochkovian sediments will also be shown.
The first circular can be expected early summer 2007.

Programme (June 2009)

June 4	arrival of participants and "Ice-breaking party"
June 5-7	technical session and ISSS Meeting
June 8-11	field trip

Contacts

e-mail contacts: silurian2009@unica.it; web site: *www.unica.it/silurian2009*

(submitted by Carlo Corradini)

July 12-17, 2009, International Conodont Symposium (ICOS 2009), University of Calgary, Calgary, Alberta, Canada

ICOS 2009 will be held at the University of Calgary (http://www.ucalgary.ca/) July 12-17, 2009. Conference Services on campus will manage the ICOS meeting including housing, registration, and fee payments; see the website at http://www.ucalgary.ca/specialevents/ for information about facilities. Lectures will be held in the Earth Sciences Building and hosted by the Department of Geoscience (http://www.ucalgary.ca/geoscience/). The University of Calgary has over 25,000 full-time students and has excellent facilities for our presentations and your accommodation. The university is located in the NW corner of the City of Calgary (http://www.calgary.ca/portal/server.pt?); a booming city of 1.1 million people that is only one-hour drive to the spectacular Rocky Mountains. The City of Calgary is host to the Greatest Outdoor Show on Earth, the Calgary Stampede, which runs July 3-12 in 2009, so you could consider a vacation to precede the meeting. Calgary can be reached directly by air from several US cities and London and Frankfurt in Europe. Asian connections are through Vancouver and many other connections can be made via Toronto. A website for ICOS 2009 will be constructed during the summer of 2007, and announcements will be sent through Con-nexus.

Technical Program and Fieldtrips:

Planning is in a very early stage, but a post-meeting Rocky Mountain field excursion to examine Paleozoic and Triassic strata from Calgary, to Banff, to Jasper and back to Calgary is anticipated. In addition, there will likely be an excursion to the pre-Conodont Burgess Shale. 2009 is the 100th anniversary of the Burgess Shale Discovery by Charles Walcott, and therefore a session on the Origin of Chordates and Vertebrates would be appropriate. A session devoted to taxonomic philosophies, that focuses on what constitutes a genus and a species in the world of conodonts, is being considered; this could be accompanied by a workshop examining specimens under the the microscope. A mid-meeting excursion could include a visit to the Royal Tyrrell Museum at Drumheller, Alberta (http://www.tyrrellmuseum.com/).

Charles Henderson would welcome suggestions regarding any aspect of the program from Panderers and sincerely hopes you consider a trip in July 2009 to Calgary – the Heart of the Canadian West. Add the dates to your calendar now and look for more details later this year.

(submitted by Charles Henderson, organizer of ICOS 2009)

Other Business:

Abstract Volume of Carboniferous Conference 2006, From Platform to Basin

Cologne, Sept. 4-10, 2006 is **now available** as Kölner Forum Geol. Paläont., 15, 130 pp., price 25 Euros
Coming soon: Publication: Field trips - eastern Ardennes and Rheinisches Schiefergebirge, Kölner Forum Geol. Paläont., 16.
http://www.ccc2006.uni-koeln.de (submitted by Hans-Georg Herbig)

ONLINE CATALOGUE OF CONODONTS

Proposal: That the Pander Society and Micropaleontology Press develop an online Catalogue of Conodonts, that will be oriented towards community participation in order to provide a continuously improving and universally accessible consensus on diagnosis, taxonomy, distribution, and systematics in this group. The Catalogue website would be maintained and administered by Micro Press and governed by the Pander Society.

Review. The efficiency of communication in the internet makes it possible to readily create a community-based online version of the Conodont Catalogue with the following features:

(1) Original type diagnoses: These would be clearly and carefully reproduced from the literature (or from the original printed Catalogue), on an individual page basis with a full-feature search function including taxonomic terms, author, date, and keywords. The original age, stratigraphic level, locality and curation of the type material would be open to comment and supplementary information.

(2) A living synonymy: Secondary subjective statements reassigning typified material in new combinations would be parsed in an interactive network according to simple and unique relational statements, any of which could be tested and refuted, in a "wiki" model open to the community but subject to transparent peer review and ratification. The effect of proposed changes could be automatically visualized, and all proposals would be documented.

Alternative synonymies, considering supported alternative criteria, could be "live" as well as the majority consensus. A stratigraphic synthesis of user-selected taxa would be a feature of the site.

The Online Catalogue would be set up with 500 taxa, including original diagnoses and currently accepted synonymies, and with the tools for adding more basionyms and synonyms in place.

The budget is based on an estimate of 100 participating institutions. Startup would include 1 mo. of web data programming (approx. $5,000) and 3 mos. of data entry (approx. $12,000). This could be covered by an initial subscription surcharge in the neighborhood of $200.

Operating costs (program maintenance and improvements, editorial, administrative) would be met by a subscription of approx. $100 per year per institution, or $50 per private member. Note that no further data entry is budgeted in view of the interactive intention of the Catalogue.

The Micropaleontology Press is an independent 501(c) 3 nonprofit, with the mission of supporting the stratigraphic sciences. It has published the Ellis and Messina Catalogues since 1942, and the journal"Micropaleontology" since 1954, and is actively involved in online data services.

(proposal by Jim Barrick; please contact Jim at jim.barrick@ttu.edu, with your support and/or your concerns)

Becoming a Part of Con-nexus

Con-nexus is a 'free' e-mail forum for the rapid exchange of ideas and information concerning conodonts and conodont research
To subscribe, go to the following webpage and enter your details:
http://lists.le.ac.uk/mailman/listinfo/con-nexus

To post a message to all other members of con-nexus (only subscribers can post), address it to:
con-nexus@lists.le.ac.uk

To unsubscribe go to the following webpage and enter your details:
http://lists.le.ac.uk/mailman/listinfo/con-nexus

This page also contains other useful information, such as how to access archives, and change your subscription information and settings.

Please note:

A) anything communicated in an email to Con-nexus is instantaneously communicated to **all** members world-wide; this, of course, also applies to any Con-nexus messages that you click 'reply' to, even if you intend to reply only to the sender. **In other words**: use with caution, i.e. your faithful servant recently felt pretty foolish when he responded to one of our members 'out of the office' messages, a response that was was seen all over the world. A new kind of Conodont Spam !!!

B) if you wish to continue to be a part of Con-nexus, then **You** have to update or change your e-mail using the system above. You have to make that change, i.e. your webmaster, or your editors, won't.

Summary of Research Interests

Palaeozoic. Boncheva; Königshof; Lane; Navas-Parejo; Park; Poole; Sashida

Cambrian. Albanesi; Bagnoli; Barnes; Dong (X-p); Donoghue; Gedik; Kozur; Lehnert; Miller (J.F.); Nicoll; Nowlan; Pyle; Qi; Repetski; Szaniawski

Ordovician. Agematsu; Albanesi; Aldridge; Bader; Bagnoli; Barnes; Bauer; Bergström; Dong (X-p); Ethington; Ferretti; Goncuoglu; Hall; Izokh; Kleffner; Lehnert; Löfgren; McCracken; Männik; Miller (J.F.); Nowlan; Obut; Percival; Pyle; Repetski; Sansom; Sarmiento; Sashida; Savage; Smith (P.); Spencer; Stouge; Suttner; Sweet; Szaniawski; Talent; Viira; Wickström; Witzke; Zhen

Silurian. Albanesi; Aldridge; Bader; Bancroft; Bardashev (I.A.); Barnes; Barrick; Bikabaev; Blanco-Ferrera; Cole; Corradini; Garcia-López; Goncuoglu; Hairapetian; Izokh; Jeppsson; Kleffner; Lehnert; Luppold; McCracken; Männik; Martinez-Perez; Metzger; Miller (C.G.); Nakrem; Norby; Nowlan; Purnell: Pyle; Sanz-Lopez; Sarmiento; Simpson; Slavik; Snigireva; Valenzuela-Rios; Viira; von Bitter; Wang (C-y); Wickström

Devonian. Agematsu; Bardashev (I.A.); Barrick; Belka; Bender; Bikbaev; Blanco-Ferrera; Bultynck; Capkinoglu; Corradini; Dopieralska; Dzik; Gholamalian; Girard; Groessens; Gouwy; Hairapetian; Herbig; Izokh; Johnston (D.I.); Katvala; Kirchgasser; Kirilishina; Klapper; Kleffner; Königshof; Kononova; Liao (J-C); Luppold; McCracken; Manship; Matyja; Metzger; Miller (C.G.); Narkiewicz; Nazarova; Over; Perri; Piecha; Pyle; Randon; Ruppel; Sandberg; Sanz-Lopez; Slavik; Snigireva; Spalletta; Suttner; Szaniawski; Uyeno; Valenzuela-Rios; Wang (C-y); Wankiewicz; Weddige; Woroncowa-Marcinowska; Yolkin; Zhuravlev

Frasnian-Famennian Boundary. Castelló-Corraliza; Gouwy; Kirchgasser; Kirilishina; Over

Sansom; Szaniawski; Valenzuela-Rios; von Bitter; Wickström
Conodont Nature. Weddige
Affinities. Katvala

Functional Morphology. Jones (D.); Nazarova; Zhuravlev
Morphogenesis of Elements. Goudemand
Ontogeny. Goudemand, Purnell

Morphometrics. Girard; Goudemand
Shape Analysis. Goudemand
Size Variation. Lai

Ultrastructure. Barnes
Histology. Dong (X-p); Donoghue; Goudemand; Weddige; Zhuravlev

Taxonomy. Bultynck; Ethington; Goudemand; Hairapetian; Johnston (D.I.); Klapper; Kleffner; Kozur Liao (J-C); Löfgren; Männik; Matyja; Medina-Varea; Metzger; Perri; Rosscoe; Sandberg; Talent Valenzuela-Rios; Zhen
Systematics. Repetski; Smith (P.)

Nomenclature. Jeppsson; von Bitter
Apparatus Structure/architecture. Purnell, von Bitter
Apparatuses. Lambert; Repetski; Savage; Smith (P.); von Bitter
Multielements. Goudemand; Kozur; Metzger; von Bitter

Paleoecology. Agematsu; Albanesi; Barnes; Beatty; Bikbaev; Bultynck; Dumoulin; Ferretti; Goudemand; Hairapetian; Henderson; Herbig; Johnston (D.I.); Jones (D.); Katvala; Kirilishina; Kleffner; Kononova; Kozur; Lai; McCracken; Männik; Matyja; Medina-Varea; Mendez; Nakrem; Narkiewicz; Nascimento; Paull; Perret Mirouse; Perri; Pevny; Purnell; Randon; Repetski; Rigo; Sandberg; Scomazzon; Snider; Snigireva; Strizke; Suttner; Talent; von Bitter; Witzke; Zhuravlev
Biofacies. Gholamalian; Liao (J-C); Piecha; Poole; Sandberg; Stouge; Valenzuela-Rios

Paleogeography. Boncheva; Katvala; Kozur; Krahl; Lane; Männik; Nemyrovska; Nowlan; Orchard; Simpson; Slavik; Wankiewicz
Paleobiogeography. Albanesi; Armstrong; Medina-Varea; Percival; Repetski; Sandberg; Yolkin; Zhuravlev
Biogeography. Agematsu; Barnes; Goudemand; Hirsch; Ishida; Klapper; Metcalfe; Zhen

Paleoclimate. Lane; Rigo; Trotter;

Seawater Strontium Isotopic Curve. Scomazzon
Stable Isotopes. Bright
Oceanic Episodes. Kleffner; Stouge
Paleothermometry. Albanesi
Paleoseawater. Trotter
Eustasy. Barnes

Sedimentology. Beatty; Männik; Wankiewicz

Tectonic Evolution. Boncheva; Poole;
Terrane Analysis. Ishida

Euconodonts. Buryi; Donoghue; Dong (X-p)
Paraconodonts. Donoghue; Dong (X-p)
Phosphatic Microfossils. Pyle

Conodont Recovery Techniques. Jones (G.L.)
Conodont Taxonomic Dictionary. Wardlaw
Curation. Meischner; Sandberg

Taphonomy. Medina-Varea; Suttner

Paleogeology. Márquez-Aliaga; Plasencia Camps

Research Activities (please also see **Other News** [below])

Agematsu, Sachiko: Reconstructing depositional environments, and establishing conodont biostratigraphy of Ordovician to Devonian strata in Thailand and Malaysia.
Albanesi, Guillermo: Lr. Paleozoic conodont faunas from W and NW Argentine basins, especially a project on high-resolution conodont-graptolite biostratigraphy of the Ordovician and Silurian systems of Argentina (with Gladys Ortega); a new project on conodont palaeothermometry from the Precordillera and Eastern Cordillera (with Ph.D. students F. Zeballo and G. Voldman).
Aldridge, Dick. Bromalites (coprolites, etc.) from the Ordovician Soom Shale (including some that incorporate fragmented remains of conodont elements); conodonts from the U. Ordovician oil shale (Kivõli Member) of Estonia, (with Viive Viira). P/T boundary at Meishan (Jiang et al. in press); polygonal patterning on gondolellid platform elements (with Jiang Haishui and Lai Xulong); a cladistic study of relationships within complex conodonts, (with Phil Donoghue, Mark Purnell and Zhang Shunxin) (just

published online); long-term study of Silurian conodonts from S. China (with Wang Cheng-yuan) (near completion); chapter on the discovery of conodont soft-tissue anatomy (with Derek Briggs) for a book *Paleontology at the High Table: A Science Matures*, David Sepkoski and Michael Ruse eds., completed.

Armstrong, Howard: Ordovician glaciation & climate, particularly the role of the Intertropical Convergence Zone as driver of climate-ocean change (the latter important for conodont sub-provinciality); growth and ecospace utilization in Ordovician coniform conodonts; detailed study of the controls on sedimentary fill of the Welsh basin through the Boda and Hirnantian events (with Tom Challands).

Bader, Jeremy: Llandovery (Silurian) conodonts from the W. Carney Hunton Field, NC Oklahoma; at least two new faunas present, not found elsewhere in S. Midcontinent.

Bagnoli, Gabriella: Conodonts and palynomorphs of Cambrian, Ordovician and Permo-Triassic successions, with the emphasis on Cambrian conodonts from N. and S. China.

Bancroft, Alyssa: Silurian conodont biostratigraphy of the Eramosa Fm. in SW Ontario, Canada.

Bardashev, Igor: Silurian and Devonian stratigraphy and conodonts of central Asia; large work: “Stratigraphy, conodonts and zonation of Devonian and adjacent deposits of Tajikistan” continues.

Bardasheva, Nina: Carboniferous stratigraphy and conodonts of central Asia.

Barnes, Chris. Applying conodont biostratigraphy, biofacies and biogeography to the pattern of eustasy and tectonism that affected northern Laurentia in the early Paleozoic (with Shunxin Zhang); geochemistry of conodonts (with Julie Trotter). Late Ordovician-E. Silurian conodonts from the Edgewood Group, Missouri-Illinois (with Tyler Kuhn and Felicity O’Brien); Late Ordovician-Early Silurian conodonts from the Kolyma Terrane, NE Russia (with Shunxin Zhang); Ordovician-Silurian conodonts from Hudson Bay (with Shunxin Zhang); Late Ordovician conodonts from s. Ontario (with Shunxin Zhang and Glen Tarrant); Ashgill-Wenlock conodonts from the Canadian Arctic (with David Jowell); Ashgill conodonts from the Whitland section, South Wales (with Annalisa Ferretti).

Barrick, James E. Silurian oceanic events, conodont faunas and stable isotopes in North America (with Mark Kleffner); Pennsylvanian conodonts in Midcontinent North America and New Mexico (with colleagues).

Bauer, Jeff: Joins and Oil Creek formation conodonts (ed. Probably Oklahoma).

Beatty, Tyler: Uppermost Permian and Lr. Triassic conodonts of the Arctic regions of Canada, Svalbard and East Greenland, as well as of western Canadian Sedimentary Basin.

Belka, Zdzislaw: U. Devonian conodont biostratigraphy, eastern Anti-Atlas, Morocco; REE isotope chemistry of conodont elements in the Variscan Europe; CAI studies in the Devonian of northern Africa.

Bender, Peter: Redeposited conodonts of the Devonian and Carboniferous conodonts of the Rhenish Slate Mtns.

Bergström, Stig: $\delta^{13}C$ chemostratigraphy; conodonts from China, North America, and Sweden; conodonts from Branson & Mehl’s (1933) classical Ozora locality (with Steven Leslie).

Bikbaev, Alexander: Silurian and Devonian conodonts and lithology and biofacies of the Urals.

Blanco-Ferrera, Silvia. CAI studies in the Cantabrian Mountains, particularly in the Picos de Europa Unit and NE area of the Ponga Nappe Unit (with S. Garcia-Lopez and J. Sanz-Lopez); different surface textures of conodonts and their geological causes (with S. Garcia-Lopez); Mississippian conodonts, particularly *Gnathodus* spp., correlating their phylogeny and their evolutionary relationships with the environmental changes caused by the beginnings of the Variscan orogeny in the north of the Iberian Peninsula (with M.-F. Perret & J. Sanz-Lopez).

Boncheva, Iliana: Devonian-Carboniferous conodonts from Bulgaria, Turkey and Iran, with emphasis on the stratigraphy, correlations and palaeogeography of Palaeozoic terranes of Bulgaria and NW Turkey; reconstruction and development of Palaeozoic marine basins, and their palaeogeography and tectonic evolution.

Bright, Camomilia: REE as a proxy in conodonts; Holocene climate change in the Mediterranean and contemporaneous societal changes.

Bultynck, Pierre: The *subterminus* conodont fauna in Europe and S. Morocco, and correlation with N. America (with Katarzyna Narkiewicz) & conodonts from the Eifelian/Givetian boundary interval in the GSSP for the base of the Givetian (with O.H. Walliser and K. Weddige)

Buryi, Galina: Morphological structures of euconodonts.

Capkinoglu, Senol: Devonian-Carboniferous boundary in the Istanbul Zone.

Castelló Corraliza, Verónica: Frasnian-Famennian Boundary.

Cole, Damian: Sampling limestones and cherts around Bungonia Limestone, southeastern NSW, Australia.

Corradini, Carlo: Silurian and Devonian of North Gondwana, mainly in Sardinia and the Carnic Alps; preliminary sampling in the Silurian of the Montagne Noire; revision of the Famennian/Tournaisian conodont biostratigraphy in Sardinia (complete); fauna with siphonodellids across the D/C boundary in Sardinia and Orthoceras limestone in several areas of the Carnic Alps.
Day, Jed: M. and U. Devonian conodont and brachiopod biostratigraphy of continental margin and reef platform and basinal facies in western Canada (Alberta and British Columbia); Givetian and Frasnian conodont biostratigraphy of the epeiric carbonate ramp system in the Iowa Basin; Famennian in subsurface of the Iowa and Illinois basins; carbon isotope hemostratigraphy of the D-C boundary interval in the eastern Missouri; oxygen-isotope geochemistry of Devonian conodont apatites to develop a major record of Devonian sea surface temperatures.
Dong, Xiping: Cambrian through Lr. Ordovician conodonts from Hunan, South China and Liaoning, N. China (with Stig Bergström and John Repetski); histology and comparative histology of protoconodonts, paraconodonts and earliest euconodonts from China (with Phil Donoghue); taxonomic revision of Cambrian conodonts and the phylogenetic analysis of paraconodonts and earliest euconodonts underway.
Donoghue, Phil: Histology of Cambrian paraconodonts and euconodonts.
Dopieralska, Jolanta: REE isotope chemistry of Devonian and Carboniferous conodonts from the Variscan realm.
Dumoulin, Julie A: Lithofacies and biofacies of Paleozoic and Triassic carbonates of northern Alaska; Carboniferous-Permian Lisburne Group in the central and western Brooks Range and Paleozoic metacarbonates on Seward Peninsula.
Dzik, Jerzy: Devonian faunas.
Ferretti, Annalisa: L. Ordovician conodonts from N. Gondwana.
García-López, Susana: Silurian to Lr. Carboniferous conodonts, mainly focusing on biostratigraphy and biofacies; CAI research in the Cantabrian Zone and Pyrenees (NW and NE Spain).
Gholamalian, Hossein: Late Devonian conodont biostratigraphy of the Tabas and Kerman areas of central, E. and SE Iran.
Girard, Catherine: *Palmatolepis* diversification during the Late Devonian; Lr. Devonian morphological response of conodonts to environmental events (with Maya Elrick and Gil Klapper), and at the Givetian/Frasnian boundary (with Malgorzara Sobstel).
Goncuoglu, Yakut: M. Ordovician-Lr. Carboniferous conodonts from northern (with I. Boncheva) and southern Turkish Palaeozoic successions.
Goudemand, Nicolas: E. Triassic conodonts; new material collected in S. Tibet in 2006; now focusing on S. China conodonts.
Gouwy, Sofie: Graphic correlation of M. Devonian and Frasnian sections in the Anti-Atlas (Morocco) and the Ardennes (Belgium); M. Devonian conodont biostratigaphy of Sardinia (Italy) and Mediterranean region (new project).
Groessens, Eric: U. Devonian and Lr. Carboniferous conodonts.
Hairapetian, Vachik: Conodonts of the Silurian Niur Fm., Derenjal Mtns., East Central Iran (with Giles Miller); U. Devonian-Lr. Carboniferous conodonts of central Iran and Armenia.
Hall, Jack: Ordovician conodont biostratigraphy at Ringgold Gap, Georgia, (short paper; ? submission, spring 2007)
Heckel, Phil: Biostratigraphy of Pennsylvanian conodonts, particularly with respect to selecting M. and U. Pennsylvanian global stage boundaries.
Henderson, Charles: U. Paleozoic to Triassic sequence biostratigraphy, western and Arctic Canada and China; Kungurian Lopingian and P-T boundary in S. China (with Nanjing Institute of Geology and Paleontology); refined biozonations by investigating evolutionary models for conodont speciation, the extent of conodont provincialism, and the recognition of geographic clines.
Herbig, Hans-Georg: U. Devonian and Mississippian conodont biostratigraphy; application of conodonts and agglutinated foraminifera to paleoecology.
Hirsch, Francis: Triassic conodont assemblages (with K. Ishida).
Ishida, Keisuke: L. Paleozoic and Triassic conodonts from SW Japan and Shan-Thai terranes; M.-L. Triassic multielement conodont apparatus analysis (with Francis Hirsch).
Isozaki, Yukio: Guadalupian-Lopingian (Permian) boundary extinction event in paleo-atoll and shelf limestone in Japan and S. China, respectively.
Izokh, Nadexhda: Ordovician-Devonian conodonts of the Altai-Sayan folded region, W. Siberia, Russia and S. Tien Shan.

Jeppsson, Lennart: 'Mid' Sheinwoodian correlations; high resolution correlations of the interval associated with the Lau Event.
Johnston, David: Conodont biostratigraphy of the u. Wabamun Group to lr. Banff Formation of S. Alberta (manuscript [with Charles Henderson] near completion); conodont biostratigraphy & geological services to Canadian petroleum industry.
Katvala, Erik: Using Mississippian-Triassic biostratigraphic, paleoecologic, and paleogeographic conodont data to constrain paleontologic, stratigraphic, and tectonic interpretations in the accreted terranes of western North America; element distributions in conodonts using electron microprobe.
Kilic, Ali Murat: Triassic conodont biostratigraphy; multielement taxonomy of some Triassic conodont genera; Triassic conodonts from Karaburun Peninsula and Taurids, Turkey (with Profs. Budurov and Hirsch); foraminifera (alas, no conodonts) from Lower Triassic of E. Taurids (Turkey) (with R. Martini and D. Yumun).
Kirchgasser, William: Late Givetian and E. Frasnian of western New York (with Gordon Baird [SUNY Fredonia], Jeff Over [SUNY Geneseo] and Carlton Brett [University of Cincinnati]); manuscript on Frasnian conodonts of N.Y. (with Gil Klapper) continues.
Kirilishina, Elena: Conodonts of the Frasnian-Famenian boundary interval of central Russian Platform.
Kleffner, Mark: Mulde, Linde and Lau events of southern Laurentia (with James Barrick); Ireviken Event and ^{13}C excursion (with Bradley Cramer); Ordovician/Silurian boundary of North American Midcontinent (with Stig Bergström); Silurian/Devonian boundary of Cherry Valley region, Appalachian Basin (with James Barrick, James Ebert and Damon Matteson).
Kolar-Jurkovšek, Tea: Biostratigraphy of the P-T interval.
Königshof, Peter: M. Devonian sequences in the Rhenish Slate Mtns. of Germany, and of Morocco and Turkey.
Kononova, Ludmila: M.- L. Devonian and E. Carboniferous conodonts.
Kozur, Heinz: Carboniferous-lowermost Jurassic conodonts including taxonomy, multielement taxonomy, biostratigraphy, palaeoecology, palaeobiogeography and CAI.
Klapper, Gilbert: Frasnian and Famennian conodont taxonomy and biostratigraphy; short manuscript "Conodont Taxonomy and the recognition of the Frasnian/Famennian (U. Devonian) Stage Boundary' in review.
Klets, Tatyana: Permian and Triassic conodonts from NE Asia.
Kovacs, Sandor: M. and U. Triassic conodont biostratigraphy of Hungary; conodont metamorphism.
Krahl, Jochen: Stratigraphy of metamorphic rocks of Crete, and P-T boundary in the unique European pelagic facies.
Lai Xulong: Permian-Triassic and Guadalupian-Lopingian boundaries in S. China.
Lambert, Lance: Moscovian chronostratigraphic boundary studies (with respective task groups); E. -M. Permian conodont studies (with B. Wardlaw, M. Nestell, G. Bell, D. Rohr et al.).
Lane, H. Richard: Arrow Canyon, Nevada; Late Paleozoic and Mississippian and E. Pennsylvanian of North American Midcontinent.
Lehnert, Oliver: Using oxygen isotopes of U. Cambrian -Silurian conodonts, from different paleogeographic areas, to calculate sea-water temperatures.
Liao Jau-Chyn (Teresa): Givetian and L. Frasnian conodonts from the Pyrenees; establishing a fine biostratigraphic scale for the Givetian; recognition of Eifelian/Givetian and Givetian/Frasnian boundaries, and origin and succession of the genus *Ancyrodella* in the Pyrenees; Givetian-Frasnian microfacies (with P. Königshof & E. Schindler).
Löfgren, Anita: Lr. and M. Ordovician conodont biostratigraphy and taxonomy of (mainly) Baltoscandia (with colleagues).
Luppold, Friedrich: Silurian/Devonian boundary, SE Turkey; field sampling in 2006, with first conodont results re boundary obtained. Ostracodes common and well preserved; biostratigraphical results necessary for biochemical data control; M. and U. Devonian conodont biostratigraphy of cephalopod limestones of Harz Mtns. (with Peter Buchholz) and Triassic conodonts of the German Muschelkalk (with Sandra Kaiser).
McCracken, Alexander (Sandy). M.- U. Ordovician to Carboniferous conodonts of various parts of Canada.
Männik, Peep. Ordovician and Silurian conodont evolution, taxonomy and palaeoecology, conodont-based high-resolution stratigraphy, bioevents and palaeogeography; focused on Baltic region, Russian Arctic (Severnaya Zemlya, Novaya Zemlya, Timan-northern Ural region, etc.) and Siberia.

Manship, Lori: U. Devonian palmatolepids.
Márquez-Aliaga, Ana: Iberian (western Tethys) Triassic paleobiology and biostratigraphy
Martinez-Perez, Carlos. Emsian conodonts from Pyrenees, Spain. Master's thesis; Supervisor J. Valenzuela-Rios; paleobiology of conodonts.
Matyja, Hanna. Mississippian facies distribution of NW Poland (completed; to be published in 2007; M. Devonian and Frasnian conodont and palynomorph biostratigraphy (with E. Turnau) and Famennian conodont and foraminiferal biostratigraphy and event stratigraphy with A. Tomas) (two papers in progress).
Meço, Selam: Triassic biostratigraphy and paleontology.
Medina Varea, Paula: Mississippian conodonts of Sierra Morena (SW Spain) and Morocco (Ph.D. thesis).
Méndez, Carlos: Carboniferous (Pennsylvanian) conodonts of the Cantabrian Mtns. (N. Spain).
Merrill, Glen: Part of *Gondolella* project (with P.H. von Bitter) in press, Jour. of Micropalaeo.; *Diplognathodus* project less current; Type Derryan of New Mexico (with Carl Rexroad, Lewis Brown, Bob Grayson et al.); Lr. and M. Pennsylvanian conodonts and stratigraphy of SE Ohio ongoing.
Metcalfe, Ian: P-T boundary conodonts of China and elsewhere; Permian and Triassic conodonts from E. and SE Asia (China, Malaysia, Cambodia) and Australia. Paper on first conodonts from a P-T transition sequence in Australia to be submitted shortly (with Bob Nicoll and Rob Willink); *Vjalovognathus*, *Hindeodus* and *Isarcicella* systematics and biostratigraphy papers (with Bob Nicoll) well along.
Metzger, Ronald: Multielement taxonomy of conodonts from Devonian State Quarry Limestone near Iowa City, Iowa.
Miller, Giles: Devonian conodonts of the Urals; and Silurian of Iran (with Vachik Hairapetian).
Miller, James: U. Cambrian and Lr. Ordovician conodonts of Utah, Nevada, and Wisconsin; Ordovician to Mississippian conodonts reworked into meteorite-impact breccias in Missouri; processing some Ordovician conodont samples from metamorphosed limestones in Scotland for Ray Ethington.
Nakrem, Hans Arne: Permian and Lr. Triassic conodonts from Svalbard (in progress), in tandem with bryozoans from same strata. Processing of Cambrian samples from the Oslo Region (in progress).
Narkiewicz, Katarzyna: Frasnian conodonts from the shallow-water succession of SE Poland (report completed); study of European equivalent of *subterminus* fauna (with Pierre Bultynck) and M. Devonian conodonts from Belarus (with Semen Kruchek) continues.
Nascimento, Sara: Pennsylvanian conodont biostratigraphy and paleoecology of the Brazilian Paleozoic Basin.
Navas-Parejo, Pilar: Paleozoic stratigraphy and conodont biostratigraphy of the Malaguide Complex (Betic Cordillera, SE Spain), and related Mediterranean domains.
Nazarova, Valentina: M. to U. Devonian and Carboniferous conodonts of the Russian Platform; functional morphology of conodont.
Nemyrovska, Tamara: Carboniferous conodonts of the Donbas, Ukraine and Cantabrian Mountains, Spain.
Nicoll, Robert: Permo-Triassic conodont faunas of Australia, China and New Zealand; Ordovician faunas of Australia.
Norby, Rodney: Silurian projects in Illinois (with Don Mikulic); helping John Repetski with a CAI conodont project.
Nowlan, Godfrey: Conodonts of rocky shoreline, Churchill, Manitoba (with G. Young & D. Rudkin); stratigraphy of the Phillipsburg tectonic slice, Quebec Appalachians (with O. Salad Hersi & D. Lavoie); CAI data compilation, Canadian Arctic Islands (with K. Dewing); recent acquisition of Lr. Paleozoic conodont data from W. and C. Newfoundland, N. New Brunswick, S. Quebec and Northwest Territories.
Obut, Olga: Ordovician conodont biostratigraphy.
Orchard, Michael: Triassic stage boundaries and selection of GSSPs; Induan-Olenekian boundary in Spiti (with Krystyn); Olenekian-Anisian boundary, Guandao, China (with Lehrmann); Ladinian-Carnian boundary in Nevada (with Balini) and British Columbia, Carnian-Norian boundary; Lr. Triassic conodonts, Canadian Arctic & Wapiti Lake, B.C.; Rhaetian faunas from Baja, California; Induan conodonts, Thailand (with Savage); Triassic conodonts, New Zealand (with Nicoll). Ongoing research on Cordilleran terrane conodont biostratigraphy and paleogeography.
Over, Jeffrey: M. & U. Devonian conodont biostratigraphy and facies, western Canada, central and eastern USA; Eifelian-Givetian and Frasnian-Famennian boundaries.
Park, Soo-In: Carboniferous and Permian conodonts, Korea; Silurian conodonts of the Hoedongri Fm., Kangwon Province, Korea.

Percival, Ian: Ordovician conodonts, concentrating on biostratigraphy and biogeography of deep-water faunas in cherts of E. Australia; faunas of New South Wales and revision of E. and M. Ordovician species from S. China (with Yong Yi Zhen, Australian Museum); Darriwilian fauna from New Zealand (in 2007)
Perret Mirouse, Marie-France: Cephalopods and conodonts of the Pyrenees (with J. Kullmann).
Perri, Maria Cristina: Devonian-E. Carboniferous and latest Permian-E. Triassic conodonts.
Pevny, Jozef: M. and U. Triassic conodont biostratigraphy of western and central Slovakia.
Piecha, Matthias: Devonian and Carboniferous conodont biostratigraphy of the Rhenish Slate Mountains; low temperature (CAI 1-2) of M. and U. Devonian conodonts from the Paffrath Syncline (Bergisches Land, Germany); conodont biofacies and hiatuses around the Frasnian-Famennian boundary on the Rhenish shelf of NW Germany.
Poole, Barney: Ordovician-Permian carbonate shelf sedimentology and stratigraphy, Permian foredeep, and Permian Sonora allochthon (deformed Ordovician-Permian strata deposited along the southern margin of Laurentia and thrust onto the Laurentian continental shelf and superjacent foredeep in the Late Permian), Sonora, Mexico (with R. Amaya-Martinez, A. Harris, C. Sandberg, C. Stevens, W. Berry) (work includes detailed stratigraphic and paleontologic studies, utilizing conodont, graptolite, brachiopod, radiolarian, and fusulinid faunas and zonation); Devonian and Mississippian stratigraphy and sedimentology in the Antler foreland basin of Nevada (with C. Sandberg), utilizing conodont, radiolarian, and ammonite faunas to record foreland evolution and depositional history.
Plasencia Camps, Pablo: Triassic conodonts, Spain; intend to study biological aspects of conodonts; special interest in the Triassic genus *Pseudofurnishius* and Triassic fishes.
Purnell, Mark: Cladistic tests of current hypotheses of relationships between the major clades of morphologically complex conodonts (with Phil Donoghue, Dick Aldridge and Shunxin Zhang)(just published online, Journal of Systematic Palaeontology); Eramosa Lagerstätte (with Peter von Bitter, Denis Tetreault and Chris Stott) (in press, *Geology*); several more papers on the Eramosa conodont skeletons to follow; application of morphometric techniques to Silurian conodonts (with David Jones) (first paper [of several] in press); quantitative studies on element growth (with a masters student), produced interesting results.
Pyle, Leanne: Cambrian to Devonian stratigraphy and biostratigraphy of a succession in the northern Mackenzie Mountains, Northwest Territories and Yukon.
Qi Yu-ping: Cambrian, Carboniferous and E. Permian conodonts from S. China (with G. Bagnoli and Z. Wang).
Randon, Carine: Permo-Triassic conodonts from N. Thailand; Pennsylvanian conodonts from Mexico (with E. Almazan).
Repetski, John: Cambrian and Ordovician systematic, CAI, and biostratigraphic studies; CAI maps for oil and gas assessment for Illinois, Michigan, and Appalachian basins; age-dating support and biostratigraphic studies for USGS mapping projects; phosphatic problematica, e.g., phosphatized embryos and larval arthropods (with fellow Panderers and other colleagues).
Rexroad, Carl: U. Mississippian conodonts of Indiana and West Virginia (with Mitch Blake and Jack Beuthin), and of Illinois (with Joe Devera); M. Pennsylvanian conodonts of Indiana and New Mexico (with Lewis Brown).
Rigo, Manuel: Biostratigraphy and oxygen isotope analysis of U. Triassic conodonts of the Lagonegro and Sicani basins (S. Italy), and the southern Alps.
Rosscoe, Steve. Missourian (U. Pennsylvanian) conodonts.
Ruppel, Stephen: Devonian and Carboniferous conodont faunas in mudrocks of the southern U.S. Mid-continent **(**with Darwin Boardman).
Sandberg, Charles: L. Ordovician, Pennsylvanian, and E. Permian of northern Sonora, Mexico (with Barney Poole); Devonian platform-to-basin transitional sequence in S. Hot Creek Range, and from the Devonian and Mississippian terrane of the southern Fish Creek Range (both Nevada) (with Poole); correlations between the Frasnian standard and M.N. zonations and re-identifications of (some) palmatolepids (with Gil Klapper); documenting the wider extent of Alamo Impact megatsunami distal uprush and backwash deposits in W. Utah; re-identifying older conodont collections and adding them to the D/C conodont database.
Sansom, Ivan: Ordovician vertebrates; habitat, diversity and dispersal of ostracoderms in Laurentia and Gondwana (with G. Albanesi [Cordoba], D. Elliott [Flagstaff], G. Miller [NHM], B. Nicoll [ANU], A. Ritchie [Australian Museum], N. Davies & P. Smith [both Birmingham]). Associated conodonts v.

important; latest field studies include the Arabian Peninsula and the Amadeus Basin, central Australia; coniform palaeobiology (with H. Armstrong [Durham] and P. Donoghue [Bristol]) ongoing.
Sanz-Lopez, Javier: CAI studies in the Cantabrian Mountains and Pyrenees (with S. Garcia-Lopez & S. Blanco-Ferrera); Mississippian conodonts particularly *Gnathodus* species (with S. Blanco-Ferrera & M.-F. Perret); Frasnian-Famennian conodonts associated with ostracods from the Pyrenees (with L.C. Sanchez de Posada & R. Gozalo); Pennsylvanian conodonts; latest Bashkirian; Kasimovian conodonts of the Cantabrian Mountains (new project).
Sarmiento, Graciela: Ordovician and Silurian conodont faunas.
Savage, Norman: Biostratigraphy, isotope excursions & apparatuses of Ordovician-Triassic conodonts, mainly of Alaska and Thailand.
Scomazzon, Ana Karina: Pennsylvanian conodont biostratigraphy and paleoecology of Brazilian Paleozoic basins; Sr and Nd of conodonts and whole rocks, Amazonas Basin, Brazil.
Shen Shuzhong: Permian-Triassic boundary, Tibet and S. China.
Simpson, Andrew: Silurian conodonts, including comparative work on lithologies, faunas and isotopes between Gotland (Sweden) and Broken River (Australia) sequences (with Ruth Mawson, John Talent and Lennart Jeppson.)
Slavik, Ladislav: Integrated biostratigraphy using conodonts of the Lr. Devonian of Central Bohemia matched against magnetic susceptibility and gamma-ray logs in outcrops; L. Silurian-E. Devonian conodont stratigaphy of the Barrandian area and Frankenwald (with Peter Carls and José Valenzuela-Rios).
Smith, Paul: Cambrian-Ordovician of NE Laurentia, particularly Scotland and Greenland (with R. Raine and J.A. Rasmussen); the apparatus architecture of primitive conodonts (with R. Dhanda and J. Repetski).
Snigireva, Maria: Silurian and Devonian conodonts and stratigraphy of the Urals.
Spalletta, Claudia: Lr. Devonian to Lr. Carboniferous conodonts of the Carnic Alps (N. Italy).
Spencer, Lee: Lr. Ordovician conodonts from the Great Basin (USA).
Stouge, Svend: Ordovician conodonts from S. China, Baltoscandia, Australia and North America (including Greenland) (with colleagues); study of GSSP candidate section (Huanghuachang section in S. China) for the M. Ordovician series nearly complete; Middle Ordovician conodonts from the Tarim Basin and W. Greenland (in progress).
Strizke, Rüdiger: Paleoecological and biostratigraphical studies (ongoing) .
Sudar, Milan: Permian and Triassic conodont stratigraphy, biostratigraphy and CAI (see published papers, with colleagues); boundary intervals from the Kasimovian-Gzhelian in the Jadar Block (NW Serbia) and from the Permian-Triassic in the Bükk Mts., NE Hungary.
Suttner, Thomas: U. Ordovician conodonts from the Pin Valley (N. India); Lr. Devonian conodonts from the Wolayer Area (Carnic Alps); Mid-Palaeozoic Alpine reefs of Austria & the development of reefal communities – the relation between conodonts and carbonate factories – whether the loss of conodont elements has taphonomic or paleoecological causes; presently collecting conodonts from shallow marine deposits for future facies related stydies.
Szaniawski, Hubert: Cambrian and E. Ordovician conodonts of the Baltic region and E. Devonian conodonts of Podolia, Ukraine.
Talent, John: Taxonomy and age-implications of Devonian-E. Carboniferous conodonts from northernmost Pakistan, NW China (Xinjiang) and E. Australia.
Trotter, Julie: Using conodont apatite as a geochemical archive to extract near primary geochemical records (e.g., Sr and O isotopes) and understanding the effects of diagenesis; investigation of the relationship between histological structure and geochemical integrity (particular emphasis on high resolution and *in situ* techniques, e.g., laser ablation, ion probes, transmission electron microscopy).
Uyeno, Tom: M. Devonian conodonts of the Mackenzie Mtns., N. Cordillera (with L. Pyle [GSC]).
Valenzuela-Rios, José (Nacho): Establishment of a detailed biostratigraphic scale for marine Devonian rocks used for international correlation (with P. Carls, M. Murphy and L. Slavik, and Ph.D. students); recognition of the standard subdivisions of the Givetian and its boundaries in the Pyrenees; Triassic rocks from W. Tethys Realm (with A. Marquez-Aliaga and P. Plasencia); on-going collaboration with ostracode, fish and coral colleagues; combined studies on conodonts-microfacies (with J-C Liao, P. Königshof & E. Schindler)(**first publication**).
Viira, Viive: Ordovician conodonts.
von Bitter, Peter: Conodont skeletons of the Silurian Eramosa Lagerstätte, Ontario (with Mark Purnell); Mississippian conodonts of E. Canada (ongoing); Pennsylvanian conodonts of the American Midcontinent

(with Glen Merrill) (ongoing); attempting to resurrect the third (and final) of the *Lochriea* triad (with Rod Norby).
Wang Cheng-yuan: Silurian Pridolian-Devonian Lochkovian conodonts of Sichuan and western Yunnan provinces; Devonian conodonts of China; Silurian conodonts of S. China (with Dick Aldridge).
Wankiewicz, Aleksandra: Devonian conodonts and biostratigraphy.
Wardlaw, Bruce: U. Carboniferous through Lr. Triassic conodont biostratigraphy; development of a dynamic conodont taxonomic dictionary; refinement of radiolarian-foraminifera-conodont biostratigraphy.
Weddige, Karsten: Inner Emsian stage boundary; conodont element thin-sections.
Witzke, Brian: Conodonts of the Winneshiek Lagerstätte, St. Peter Sandstone, NE Iowa.
Woroncowa-Marcinowska, Tatiana: M. and U. Devonian conodonts from Holy Cross Mtns.; integrating conodont and goniatite biostratigraphy (studies of Polish Geological Institute collections); conodonts of the Frasnian-Famennian and Eifelian/Givetian boundary interval (in progress).
Yao Jianxin: Permian and Triassic conodonts of S. China and Ordovician-Triassic stratigraphy in S. China, Tarim Basin, Kunlun Mtns. and Tibet.
Yolkin, Evgeny: Devonian conodonts of W. Siberia (Russia) and S. Tien Shan (with N.G. Izokh).
Yoshida, Takashi: Age and biostratigraphy of Permian and Triassic conodonts.
Zhen Yong-Yi: Ordovician conodonts of New South Wales, Tasmania, New Zealand, and S. China.
Zhuravlev, Andrey: M. Devonian-Lr. Carboniferous conodonts of N. Urals, Pay-Khoy, and southwestern part of E. European Platform (as part of geological mapping projects); biostratigraphic and biogeographic aspects of M. Permian conodonts of the eastern part of E. European Platform and Russian Far East; morphological and histological trends and sequences in the Late Palaeozoic conodont elements (in progress).

Other News:

Agematsu, Sachiko. Research Fellow of the Japan Society for the Promotion of Science.
Albanesi, Guillermo. Collaborating with Argentine university colleagues, and others, on diverse topics of historical geology from the Lower Paleozoic of South America, including conodont biostratigraphy, sequence stratigraphy, events, and paleothermometry.
Armstrong, Howard A. Two lengthy spells off work means that this has been a low productivity year.
Bader, Jeremy: Working on Master's thesis, under James Barrick. Am planning to pursue a Ph.D. at Texas Tech working on Cambrian conodont and trilobite biostratigraphy.
Bancroft, Alyssa M. Working on Master's degree at Ohio State University, with Mark Kleffner as advisor. Previously studied Pennsylvanian (Desmoinesian) conodont biostratigraphy of two cores in Posey Co., Indiana, with Lewis Brown at Lake Superior State University.
Beatty, Tyler. Final goal is completing Ph.D. dissertation.
Bender, Peter. Retired
Bergström, Stig. Although retired, work regular hours in my office and lab.
Currently writing paper on conodont biostratigraphy of the Siljan region, central Sweden, that will contain the previously unpublished species logs that were used for the M. and U. Ordovocian conodont zone classification introduced by me in 1971.
Blanco-Ferrera, Silvia. Continuing Ph.D. studies
Clark, David L. In retirement, continue to read of the accomplishments of some of the students with whom I worked and am pleased that our group made a modest contribution to conodontology. Too bad that we can't start over, but having at the start everything we have learned during the past 50 years.
Dong Xiping. Intend to name a new genus after Jim Miller, based on phenomena he found as early as 1980, and verified recently by our histological study.
Ethington, R.L. Still working (fitfully at times) on unfinished efforts of the past 40 years.
Ferretti, Annalisa. A new genus proposed from the Tremadocian of southern Montagne Noire (France) (see Serpagli, E. et al., in press).
Gedik, Ìsmet. Impacts of information-building on developments of palaeontological taxa during earth history; the cause of Cambrian explosion due to the exponential nature of information development; and reflectance of palaeobiological information potential on the social structures of humanity.
Goudemand, Nicolas. Still working on Ph.D.; preliminary results on Spathian conodonts from Darwin section, California, presented at two conferences in 2006.

Groessens, Eric. Mainly working on history of geology and on ornamental and decorative stone
Hall, Jack C. This past year has been devoted to transforming our program to a department. We have hired three new faculty (giving us seven total) and have been concentrating on developing a policy and procedures manual for the department and working on a graduate program proposal. This should be submitted to general administration in January. Being Chair is a big time bite, and research activities have sufferered; haven't lost interest, I just seem to have lost time!
Harris, Anita. Madly busy working for USGS [gratis] and consulting for private entities [nongratis].
Henderson, Charles. As Chairman of the Subcommission on Permian Stratigraphy, I am focusing on completing GSSP definitions for the Permian System. Most of my six graduate students in the Consortia for Applied Basin Studies (www.geo.ucalgary.ca/asrg) are conducting sequence biostratigraphic/petroleum geology studies in the subsurface of Alberta and NE British Columbia on uppermost Devonian to uppermost Triassic rocks as well as the dynamics of recovery from the P-T extinction and U. Paleozoic comparisons between the Wrangellia and Alexander terranes. One student doing elemental mapping of conodonts using a microprobe.
Herbig, Hans-Georg. Due to my special interest in carbonate environments and corresponding biota, progress on conodonts is slow. Manuscripts on faunas from the Betic Cordillera and the Catalanides (Spain) await completion.
Hirsch, Francis. From May to September 2007, will be working at Kyoto University Museum.
Igo, Hisayoshi. Although retired from the University of Tsukuba 10 years ago, I am still working on Carboniferous and Triassic conodonts from Thailand, Russian Far East and Japan.
Jeppsson, Lennart. During 2007, hoping to finish at least parts of these projects related to interests in'Mid' Sheinwoodian correlations, and high resolution correlations of the interval before, during, and after the Lau Event. Fieldwork and conodont extraction has focused on finding successions, distal enough to be complete, with the hitherto less well studied (minor?) events (chiefly Ansarve, Boge, Linde, Klev) and the early Ludlow.
Jones, David. Just graduated with Ph.D. from University of Leicester; am presently completing papers on Ph.D. research, as well as seeking funding to continue post-doctoral research.
Jones, Gareth. Continuing to manage Conodate Biostratigraphic Services and completing second and final year as President of the Institute of Geologists of Ireland.
Kilic, Ali Murat. With a change in university, research was postponed for a few months; plan to work on the M. Triassic holothurian sclerites of the Kocaeli Peninsula (with H. Kozur). Next summer plan to focus on the P-T boundary.
Königshof, Peter. Focus on sequence stratigraphy, sea level changes and biostratigraphy are part of collaborative research projects with colleagues from USA and Turkey. Furthermore, a lot of administrative work was accomplished as co-leader of IGCP 499, including improving the website, compiling annual reports and organizing meetings and workshops. Further information re IGCP 499 "Devonian land-sea interaction: evolution of ecosystems and climate" (DEVEC) at: http://www.senckenberg.de/igcp-499/
Krumhardt, Andrea. Unfortunately, not much conodont work recently with most of the time being spent on Quaternary pollen and stratigraphy; however, the biostratigraphic lessons learned with conodonts have been very helpful with the rest of the geologic column!
Kurka, Mira. Operating a small conodont lab at Great Basin College taking in samples from the local mining industry.
Lambert, Lance. Most of my students still prefer ammonoids to conodonts !!!
Lane, H. Richard. Continuing to arrange for the review of major and minor research proposals for the NSF. Have organized a session at AAPG entitled Deep Time Paleoclimatology—a Research Frontier. Will be presenting a paper in that session. Also organizing a session at the ICCP in Nanjing, China this June, on Late Paleozoic paleoclimatology and paleogeography.
Lang Jiabin. General paleontology.
Lehnert, Oliver. Cooperating with colleagues and friends from various countries to measure oxygen isotopes in conodonts. Goal is to get a good data set with respect to paleoclimatic changes and connected extinction events. Even when the intense labwork takes most of my time, am still trying to work on some conodont faunas and associated material.
Liao Jau-Chyn (Teresa). Finishing my Ph.D.
Luppold, Friedrich W. Cooperation with Research Centre Jülich since 2005 continues; Project BIOSIDE (Biochemistry and Biostratigraphy during the time of early land plant evolution).

McCracken, Alexander (Sandy). Much of my time is now assigned to outreach and palaeontological databases.
McHargue, Tim. Not active in conodont research at the moment, but working on stratigraphy, turbidite architecture.
Metcalfe, Ian. Appointed Associate Editor for both “Gondwana Research” and “Journal of Asian Earth Sciences”.
Meischner, Dieter. Curating published conodont faunas, especially type material, in the collections of the University of Göttingen.
Metzger, Ron. Heavy teaching load limits research.
Miller, C. Giles. Research time has been severely limited this year, because of involvement with curatorial database projects.
Narkiewicz, Marek. Unfortunately, no longer working on conodont studies, and would like to pass on good wishes to conodont colleagues. May the Pander spirit stay with you all !!
Navas-Parejo, Pilar. Beginning Ph.D. thesis.
Norby, Rod. Still, unofficially, overseeing the Illinois State Geological Survey’s paleontology collections.
Nowlan, Godfrey: Only a moderate level of conodont research at the moment. Continue to receive samples and prepare reports for GSC clients.
Önder, Fuat. Now retired and working on quality in education.
Paull, Rachel. Although no longer able to process samples, I am still working with extensive database on Lower Triassic sections in the western U.S.A.
Percival, Ian. Some results of my work on deep-water conodonts in cherts of eastern Australia were presented at ICOS2006 in Leicester, where I gained much from participation in the pre- and post-conference excursions.
Poole, Barney. Completing legacy geologic studies in Sonora and Nevada as Geologist Emeritus with the USGS.
Plasencia Camps, Pablo. Still working on Master’s thesis that I hope to finish this year. Ana Marquez-Aliaga and Nacho Valenzuela-Rios are my research directors, with additional supervision from Francis Hirsch. I am a biologist and intend to study biological aspects of conodonts with a special interest in the Triassic genus *Pseudofurnishius* and also Triassic fishes.
Pyle, Leanne. My research in the Northwest Territories and the Yukon is in support of hydrocarbon energy resource assessment along the Mackenzie Corridor. Since joining the Geological Survey of Canada in 2005, have also been appointed adjunct professor at the University of Victoria.
Randon, Carine. Have completed my Ph.D. on Late Devonian and Lower Carboniferous conodonts from siliceous sediments in Thailand and Europe (France, Spain).
Rosscoe, Steve. Still working on my Ph.D. at Texas Tech.
Sandberg, Charles A. Forty years after attending the Pander Society organizational meeting in Calgary and in my 13th year as an Emeritus, I am still very active professionally.
Sashida, Katsuo. Paleozoic and Mesozoic radiolarians.
Scomazzon, Ana Karina. Completed my Ph.D. thesis in the past year; also, co-supervisor of Ph.D. student working on conodont biostratigraphy of Carboniferous deposits of Amazonas Basin.
Simpson, Andrew. Largely preoccupied with Macquarie University’s Museum Studies program these days, but hoping to find time to further work on unpublished Silurian faunas recovered in the MUCEP laboratory.
Slavik, Ladislav. A projected 3-year study “Integrated biostratigraphy of the Lr. Devonian of Central Bohemia matched against magnetic susceptibility and gamma-ray logs in outcrops”, commenced in 2006. My activities as (a) leader are mostly focused on using conodont data as a principal biostratigraphic tool.
Snider, Avalon. After having spent most of my working life as an assayer testing and hallmarking precious metals for the London Assay Office at Goldsmiths’ Hall in London, decided to pursue a new career in the Geology Department at the University of Plymouth with an emphasis on conodonts. No research activities at present but hope to start field work under guidance, so that I can start to use skills of identification. Am particularly interested in the conodont animals and would like to study their evolution, environment, biology, and what caused their extinction.
Spalletta, Claudia. Please note my new e-mail address effective April, 2007.
Sweet, Walter C. The only current conodont-related activity since my retirement from OSU in 1988 is the continuance of the organization of my Ordovician graphic-correlation data.
Talent, John. Please note my new e-mail address.

Trotter, Julie. Attained Ph.D. in 2006.
Valenzuela-Rios, José (Nacho). In Sept. 2006, was appointed Head of the Department and Director of the University Museum of Geology; please note new telephone and fax numbers.
von Bitter, Peter. After nearly 40 years of looking, 'found' a copy of Christian Pander's original 1856 publication, in a book store in Tübingen, Germany. The words, i.e. the text, of the conodont work is bound together in one volume with the text of Pander's other three (1857, 1858, 1860) fossil fish works; the plates of the four works are bound together in a separate volume. Does anyone have access to an original copy of the 1856 conodont work, i.e. can anyone tell me how/if the plates and the text of the 1856 conodont work, were originally together in one volume?
Weddige, Karsten. Documenting the 'status quo' of the Devonian stratigraphy by compiling, commenting and editing annual issues of the "Devonian Correlation Table" (DCT) and contributing to the Devonian in similar publications.
Wickström, Linda. Although my work at the Geological Survey of Sweden is focussed on working with the geological collections, still have a keen interest in conodontology.

Obituaries:

Michel Coen (1943-2006)

was born in Brussels on May, 8th, 1943 and died accidentally at home on April 26th, 2006. Michel graduated in Geology from the University of Louvain (UCL) in 1967, obtaining a doctorate in 1973, with a dissertation on the stratigraphy of the Devonian in the eastern part of the Dinant syncline. To establish the stratigraphy in this region, he mainly used conodonts. He published on facies evolution, the conodont succession and stratigraphy of the Frasnian in the eastern of Belgium, in which he discussed in detail the evolution of the genera *Ancyrodella* and *Ancyrognathus*. He suggested that the Frasnian should be equated with the *Ancyrodella*-bearing beds. Later, together with his wife Marie Coen-Aubert, a Devonian reef and coral specialist, he published on sections in the Philippeville area, correlating the biostratigraphical range charts based on different fossil groups. He was also concerned with the tectonic structures of the Vesdre Basin. They worked first under the scientific direction of Marius Lecompte, and after his death in 1970, with Raphaël Conil.

Michel spent his career in the Geology Department of the Catholic University of Louvain-la-Neuve. He first began teaching in 1979-1980, when R. Conil was ill, and after Conil's death he was professor of palaeontology from 1991 to 1996. After this, he returned to his research activities. As he was essentially a field geologist, he became manager of the cartographical team at UCL, of the geological mapping of the Walloon region. He continued to be interested in conodonts, but in the late seventies he started studying ostracodes, first those of the Lower Carboniferous, and later those of the Devonian and Quaternary, concentrating at the end on Misissippian ostracodes of China.

(submitted by Eric Groessens)

Nicolas Mouravieff (1936-2007)

born in Brussels on June 7th 1936, died near Louvain-la-Neuve, Belgium, where he lived, on the 19th of May, 2007.
Nicolas became assistant to Professor Marius Lecompte (1902-1970), Devonian coral, stromatoporoid and reef specialist, in 1960, and was put in charge of the study of the conodonts from the type locality of the Frasnian, at Frasnes. After military duty in the Corps of Engineers, he returned to Louvain University, becoming full time assistant in 1962, and senior assistant and "Chef de Travaux" in 1973. After the death of M. Lecompte, he became assistant to Raphaël Conil (1930-1990), under whose direction he presented his PhD entitled « Conodontes du Frasnien de la Belgique – Biostratigraphie et aspects écologiques » in 1970. He was one of the first to study the relationship between conodonts and their environment, a part of his work being published in a special volume « Papers on the Frasnian-Givetian Boundary » produced by the Subcommission of Devonian Stratigraphy (Brussels, 1982) and entitled « Conodont stratigraphic scheme of the Frasnian of the Ardennes ».

Nicolas was an intelligent and cultivated man, in charge of the practical aspects of teaching geology students, particularly those involving fieldwork. In this work, he was meticulous and always took care of details, qualities that his students and colleagues valued. For many years, Nicolas and I organised weekends in the French Boulonnais to introduce beginning geology students to their new studies, an activity he continued even after his retirement in April 1998.

Nicolas is survived by his wife Jocelyne Mouravieff-Aubin, a well-known sculptress and poetess.

(submitted by Eric Groessens)

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